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A RESIDENCE

AMONG

THE CHINESE:

INLAND, ON THE COAST, AND AT SEA.

THE TEA COUNTRIES OF CHINA.

BY THE SAME AUTHOR,

TWO VISITS TO THE TEA COUNTRIES OF CHINA AND THE HIMALAYA, with full descriptions of the Culture of the Tea Plant, &c. *Third Edition.* Woodcuts. 2 vols. post 8vo. 18*s.*

METHOD OF MAKING "CAPER" TEA.

A RESIDENCE

AMONG

THE CHINESE:

INLAND, ON THE COAST, AND AT SEA.

BEING A NARRATIVE OF SCENES AND ADVENTURES DURING A THIRD VISIT TO CHINA, FROM 1853 TO 1856.

INCLUDING NOTICES OF MANY NATURAL PRODUCTIONS AND WORKS OF ART, THE CULTURE OF SILK, &c.;

WITH SUGGESTIONS ON THE PRESENT WAR.

By ROBERT FORTUNE,

HONORARY MEMBER OF THE AGRI-HORT. SOCIETY OF INDIA, AUTHOR OF "THREE YEARS' WANDERINGS IN CHINA," "A JOURNEY TO THE TEA COUNTRIES," ETC.

WITH ILLUSTRATIONS.

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PREFACE.

It is now nearly fourteen years since I landed in China for the first time, in the capacity of Botanical Collector to the Horticultural Society of London. From 1848 to the beginning of 1851 I was engaged by the Honourable Court of Directors of the East India Company in procuring supplies of tea-plants, seeds, implements, and green-tea makers, for the government plantations in the Himalayas. In the end of 1852 I was deputed a second time by the East India Company for the purpose of adding to the collections already formed, and particularly of procuring some first-rate black-tea makers for the experimental tea-farms in India.

The present volume gives an account of my last travels amongst the Chinese—from 1852 to 1856—which it is hoped will be found as interesting as my former 'Three Years' Wanderings,' and 'Journey to the Tea Countries.'

During my first visit my investigations were chiefly confined to the coast near the five ports at which foreigners are permitted to trade. In my second book I described some long journeys to the green and black tea countries; and in this one I have endeavoured to give the reader a minute account of some extensive districts of country

14[illegible]

which lie between the coast-line and the points formerly reached. For the talented sketches which illustrate the work I am indebted to my friend Mr. Scarth.

In keeping a journal of the ever-varying scenes which passed daily in review before me, I have not been unmindful of a friendly hint which I received from some reviewers of my former works. I have, therefore, endeavoured to describe more minutely the characters, manners, and customs of the Chinese in those districts in which I lived for a length of time almost like one of themselves. And with regard to this part of the performance I can only say that the figures on my canvas are such as I daily met with in the course of my travels, and are true to nature. The reader is left to draw his own conclusions; but it is hoped that those who have been inclined to form their estimate of the Chinese character from what has been written about the low rabble of Canton, will, after the perusal of these pages, look with a more favourable eye upon the inhabitants of China when seen from other points of view.

The natural productions of the country which came under my notice, whether simply ornamental in their character, or articles of commercial value, have been fully described. During a sojourn of some months in the heart of the great silk country I had an opportunity of seeing the cultivation of the mulberry, the feeding and rearing of the silk-worms, and the reeling of the silk; and these in-

teresting operations are now described, I believe, for the first time by an English eye-witness.

The concluding chapter gives the author's views upon the late disturbances at Canton. It shows how these might have been avoided, and suggests a line of policy by which our future relations with the Chinese may be placed on a more firm and satisfactory basis. These suggestions are of importance, not to England only, but to all civilized nations in the West who trade with China, or who may be interested in her future welfare and progress.

The remarks on the climate of China, with reference to the health of our troops, are the results of long experience, and, in the event of our going to war with that country, ought to be carefully considered by those who have the direction of the expedition.

Having thus given a general idea of the scope of the work, I have only to express a hope that, while it may add to our knowledge of the people and productions of China, it may, at the same time, enable us to look with more kindly feelings on a large portion of the human family, far more ancient as a nation, and as industrious, if not so civilized, as ourselves.

Brompton, April, 1857.

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THE CHINESE:

INLAND, ON THE COAST, AND AT SEA.

CHAPTER I.

Arrival at Shanghae — Kindness of Mr. Beale — An earthquake — Chinese superstitions — Hairs said to come out of the ground — An examination and the result — Reports of a sunken village — Preparations to visit it — Contradictory statements — The truth at last! — The Chinese rebellion — Its rise and progress — Taking of Nanking — Alarm at Shanghae — Means taken for protection — Taoutai's request for foreign aid — Sir George Bonham proceeds to Nanking — Arrogance of the insurgents — War-vessels of America and France visit them — The religion of the insurgents fanaticism — An extraordinary official statement — Future prospects as regards Christianity.

On the 14th of March, 1853, the Peninsular and Oriental steam-ship "Ganges," in which I was a passenger, sailed from Hong-kong for the port of Shanghae—the most northerly of the five at which foreigners are permitted to trade. The wind for the most part of the way was "right a-head," and sometimes it blew almost a gale; but the good ship, being powerful for her size, and well found in everything, ploughed the ocean "like a thing of life," and notwithstanding head winds and heavy seas we anchored in the Shanghae river four days

after leaving Hong-kong, having run in that time somewhere about nine hundred miles.

As on former occasions, I determined to make this port my head-quarters during my travels in the interior owing to the facilities it afforded for the despatch of my collections to India or to England. I was lucky enough to find my friend Mr. Beale, to whom I was so much indebted during my former "journey to the tea districts," still in Shanghae, and as kind and hospitable as ever. He again invited me to make his house my home whenever I should visit this port, an invitation of which I availed myself frequently during the three years I have been in the country. His large and interesting garden I found of the greatest value, as in it I could store my various collections until an opportunity occurred of having them shipped for their destination.

During the few days of my stay in Shanghae I experienced for the first time in my life the shock of an earthquake, a phenomenon which is not unusual in this part of the world. It was about eleven o'clock at night, one of those beautiful nights which one finds only in the sunny lands of the East. The stars were shining brightly in the sky, but a slight haze seemed to spread itself over the ground and the river; and the atmosphere, although perfectly calm, was warmer than is usual at this early period of the spring. I had been dining out, and had just returned home, and was sitting with Mr. Beale at the drawing-room fire.

In an instant I experienced an extraordinary and unaccountable sensation, which was perfectly new, and which I could neither understand nor explain. At the same moment the pheasants in the aviary began to scream, and the chandelier which hung from the ceiling swung slowly from side to side. "It is an earthquake," said Mr. Beale; "let us go out on the lawn in front of the house." I confess I did not require a second bidding, but rushed out of the house forthwith. Mr. Beale, who seemed to have become accustomed to such things, quietly went to look for his hat in the lobby and then followed me. In the mean time his Excellency Sir George Bonham, her Majesty's Plenipotentiary and Governor of Hong-kong, who was staying at this time with Mr. Beale, came down stairs, and all the other gentlemen in the house made their appearance also, most of them in their night-dresses, as they had retired to rest before the occurrence took place. All this happened in much less time than I take to write it. When we reached the lawn the ground seemed moving and swaying to and fro under our feet, and I experienced a slight sickening sensation not unlike sea-sickness. At the same time the whole scene was rendered more striking by the ringing of bells in the adjoining houses, the screams of birds, and the crash of a falling house as we thought, but which turned out afterwards to be a slimly-built wall. The first shock lasted for a few minutes only, but several were felt afterwards, although less severe than the first.

When daylight dawned on the following morning it was found that the damage done was not very great. The wall I have already noticed had fallen, some beams in one of the houses had come through the ceiling, and a quantity of goods had tumbled down in one of the godowns. Most of the clocks had stopped, and some few lamps and glasses were broken, but upon the whole the damage done was very inconsiderable. Groups of Chinese were seen in the gardens, road-sides, and fields, engaged in gathering hairs which are said to make their appearance on the surface of the ground after an earthquake takes place. This proceeding attracted a great deal of attention from some of the foreign residents in Shanghae, and the Chinese were closely examined upon the subject. Most of them fully believed that these hairs made their appearance only after an earthquake had occurred, but could give no satisfactory explanation of the phenomenon, while some more wise than their neighbours did not hesitate to affirm that they belonged to some huge subterraneous animal whose slightest shake was sufficient to move the world.

I must confess, at the risk of being laughed at, that I was one of those who took an interest in this curious subject, and that I joined several groups who were searching for these hairs. In the course of my travels I have ever found it unwise to laugh at what I conceived to be the prejudices of a people simply because I could not understand them. In this instance, however, I must confess the

results were not worth the trouble I took. The hairs, such as I picked up, and such as were shown me by the Chinese, had certainly been produced above the earth and not below it. In some instances they might readily be traced to horses, dogs, and cats, while in others they were evidently of vegetable origin. The north-eastern part of China produces a very valuable tree known by the name of the hemp-palm, from the quantity of fibrous bracts it produces on the stem just under its blossoms. Many of these fibres were shown to me by the Chinese as a portion of the hairs in question; and when I pointed out the source from which such had come, and which it was impossible to dispute, my friends laughed, and with true Chinese politeness acknowledged I was right, and yet I have no doubt they still held their former opinions concerning the origin of such hairs. The whole matter simply resolves itself into this,—if the hairs pointed out to me were the *true* ones, then such things may be gathered not only after earthquakes but at any other time. But if, after all, these were not the real things, and if some vegetable (I shall not say animal) production was formed, owing to the peculiar condition of the atmosphere and from other causes, I can only say that such production did not come under my observation.*

* During a recent visit to the north-west provinces of India, where earthquakes are not unfrequent, I could find no traditions such as that I have alluded to.

A day or two after the earthquake took place a report was current amongst the natives that a large tract of ground, on which a populous village stood, had sunk down into the bowels of the earth, carrying with it the whole of the people, and that the spot was now marked by a large pool of water. This report was repeated to me in the country at a considerable distance from Shanghae, and seemed to be generally believed by the inhabitants. An old nursery-gardener, from whom I was in the habit of purchasing plants, informed me the village in question had been full of bad people, and that this was no doubt a judgment from heaven on account of their sins. I hinted that there might be some danger to his own property and to the city of Shanghae; but the old man told me my fears were groundless.

Being anxious to verify the reports of the Chinese by a personal examination of the place, I determined to pay it a visit. Mr. Forbes, American Consul at Canton, and Mr. Shortrede, editor of the 'China Mail,' agreed to accompany me. I had been told the spot was distant from Shanghae some thirty miles up the river, and in a south-westerly direction, but the more minute my inquiries were the greater difficulty I had in finding out the exact locality. In the mean time all our arrangements had been made except the hiring of boats, and we had agreed to start on the following morning. I had an excellent servant, a man who had travelled with me for several years, and whose

duty it was to engage the boats we required for the journey. Before he left me for this purpose I desired him to take care the boatman knew the road, as it would never do to find out after we had started that no one knew which way to go. He left me on this mission, and was absent about two hours. When he returned he informed me that he had made the requisite inquiries about the sunken village, that such an occurrence had taken place, but instead of the spot being *up* the river we must go *down* in an opposite direction in order to find it. At the same time he told me candidly he did not think the boatman knew anything about the matter, and said I had better not go until something more satisfactory could be ascertained concerning it. I was reluctantly compelled to admit that his advice was good, and wrote to the others saying we had better put off the journey. And now it is worth while to mark the result of all this in order to get an idea of the extraordinary character of the people of China. A few days afterwards we were told with the greatest coolness, by the same parties who had formerly given the information about the sunken village, that "it was quite true such an occurrence had taken place, but that it had happened about two hundred years ago!"

While these events were going forward the rebellion in the interior of the country was causing the greatest excitement, not only amongst the natives, but also amongst foreign residents. The

rebels were known as the Kwang-si men, as they belonged to the province of that name, which had been for several years in a state of great disorder. In 1850, three years before the time of which I write, a memorial, presented to the government by a number of gentlemen in the province, shows that fully two-thirds of it was overrun by robbers, who committed great violence upon the inhabitants. "At the time the petition was written hundreds and thousands of fields were lying uncultivated; the communications were in the hands of the outlaws, so that the supplies of government could not travel." About the close of 1850 the well-known Commissioner Lin was summoned from his retirement in Fokien in order to put down the insurgents, but he died on the way. Sundry other high officers, civil and military, were sent against them, but apparently with but little success. In August, 1851, Hung-sew-tseuen, subsequently known as Tai-ping-wang, seized Yung-ngan, a city of a subprefecture in the east of the province, and held it until April, 1852. The insurgent force, of which he was the chief, advancing slowly at first, then commenced its northern march by moving upon the provincial capital Kwei-lin. The rebels soon left this city behind them, and, after seizing and abandoning various places in the south of Hoo-nan, in the middle of December took Yohchau, a city on the river Yang-tse-kiang. Before the end of the month they had crossed this river, and stormed Wu-chang, the capital of Hu-peh; then descending

the stream, they captured every city of note on or near its banks, both in Kiang-si and Ngan-hwui, until they arrived at Nanking, the ancient southern capital, in Kiang-su, which they stormed in March, 1853.*

When the news of the success of the rebels at Nanking and Chinkiang reached Shanghae, the alarm amongst all classes of the community was very great. Some persons were of opinion that the insurgents would march straight upon Shanghae, attracted thither by the reported wealth of the foreign merchants; and while the better informed did not apprehend much danger from this source, nearly all agreed in the propriety of taking some precautionary measures for the protection of the settlement. Meetings were held at the British Consulate, parties of sailors and marines were landed from our men-of-war, some rude fortifications were hastily thrown up, and every precaution was taken to prevent a surprise. It turned out afterwards that, however prudent these measures were at the time, they were quite uncalled for, as it does not seem to have been the intention of the insurgents to molest foreigners in any way whatever.

The Taoutai of Shanghae — a native of the Canton province, and a man of reputed wealth — had been making great exertions in order to put down the rebellion. He had chartered a number of Portuguese lorchas and other vessels, and sent

* T. F. Wade, in 'China Mail,' Sept. 12, 1855.

them up to Nanking to arrest the progress of the now victorious and successful insurgents. In addition to this, he applied to Mr. Alcock, her Majesty's Consul at the port, to request Captain Saunderson, of H.M. brig "Lily," to proceed with that vessel to Nanking, and exterminate the rebels. Captain Saunderson very properly refused to comply with this *modest* request, stating at the same time that a small sailing-vessel like the "Lily" would be useless in a river where the tides were rapid.

Her Majesty's Plenipotentiary, Sir George Bonham, having in the mean time arrived at Shanghae in the "Hermes," accompanied by the "Salamander," both war-steamers, the Taoutai renewed his application. After giving an account of the progress of the rebels received from the governor of Kiangsoo, which concluded by stating that, "if they are not speedily cut off, commerce will be interrupted, and the business of Chinese and foreign merchants will be totally ruined," he goes on as follows :—

"I have to request that you will, in the first place, despatch the vessels of war which may have already arrived at Shanghae, together with that stationed there, to Nanking, that they may, with the lorchas under their command, make a combined attack, solemnly binding themselves to extirpate the rebels, in order to gratify the public mind and open the path of commerce. I have also to request that you will urge by letter the

speedy advance of the vessels which have not yet arrived, and their successive departure for Nanking, in order to sweep away every remnant of rebellion, and give tranquillity to the country, to the great happiness of myself, the Chinese officials, and people. For this I earnestly pray and earnestly entreat."

A polite answer was sent to this "earnest" communication; but as Sir George Bonham had made up his mind to remain strictly neutral in the affair, the poor Taoutai's request for foreign aid was not complied with, and Nanking, with Chingkiang-foo, soon fell into the hands of the insurgents.

About this time the United States steam-frigate "Susquehanna," with his Excellency Colonel Marshall on board, made an attempt to reach Nanking by the Yang-tse-kiang, but, finding some difficulty, owing, it was said, to the shallowness of the river and the numerous sandbanks, returned to Shanghae without having accomplished the end in view. Afterwards this vessel was more successful.

Meanwhile the excitement amongst all classes of the community at Shanghae daily increased, and all sorts of exaggerated reports were promulgated. At one time it was reported that the insurgents were within thirty miles of us, and might be upon us at any moment. In addition to the means we had taken for the protection of the foreign settlement, the Taoutai, after his own manner, was most indefatigable in taking measures

for the safety of the city. He purchased large supplies of gunpowder and guns from foreigners, enlisted soldiers, and called out the militia. But evidently being rather doubtful of the results, and perhaps not having much confidence in the bravery of his troops, he removed his treasure from the Imperial treasury in the city, and placed it on board of H.M. brig "Lily."

Captain Fishbourne, in his 'Impressions of China,' gives us an anecdote which shows plainly that the old man was in a great state of alarm:—"About this time I asked him how it was that, with such large and well-appointed armies as the Imperialists investing Nanking were said to be, they did not recapture it? He answered, these thieves were not men, they were devils; that they had undermined all the ground inside the walls; that the Imperialists had effected a breach in the walls, but, anticipating an ambuscade, they had driven a large number of buffaloes in through the breach, and that these had all disappeared into a dreadful gulf which the insurgents had made."

Things were in this state when Mr. Meadows, Interpreter to the Consulate, volunteered to try and reach the insurgent camp, and obtain some definite information with regard to their position, their numbers, and particularly their views with regard to Shanghae. He left Shanghae on the 9th of April in his own boat, with a picked crew, and, having a fair southerly wind, reached Soo-

chow on the following day. On the 13th he passed the city of Chang-chow, and on the 14th he arrived at a place called Tan-yang. At this place his boatmen and servants seem to have objected to proceed, and, meeting a man whom he had previously despatched to procure information, he returned to Shanghae in order to communicate to Sir George Bonham the information he had been enabled to gather during his journey connected with the movements of the insurgents.

Mr. Meadows was led to believe that the army of the insurgents numbered from thirty to forty thousand of "trusted and voluntary adherents," and in addition they had from eighty to one hundred thousand of pressed men and other adherents. "The strangest," says Mr. Meadows, "and what will probably prove by far the most important fact connected with them, is, that they have got a sacred book, which the chiefs and the older members of the army not only peruse and repeat diligently themselves, but earnestly admonish all new comers to learn."

The information communicated by Mr. Meadows, and the well-known fact that the Chinese authorities in Shanghae had been endeavouring, by every means in their power, to make the insurgents believe that foreigners were to take the part of the Imperialists in the quarrel, induced Sir George Bonham to proceed himself to Nanking in the "Hermes."

From a careful perusal of the published account

of this expedition it appears to have been useful in setting the insurgents right as to our determination to remain strictly neutral, and at the same time, if their statements were to be relied upon, it was ascertained that they had no intention of molesting us in any way at Shanghae. But the officials amongst the insurgents appear to have been full to the brim with Canton ideas of their superiority over all the nations of the earth, which augurs ill for our future connection should they be successful in upsetting the present dynasty and establishing one of their own. Listen to the modesty of the "Northern Prince:"—"The Lord of China is the lord of the whole world; he is the second son of God, and all the people in the whole world must obey and follow him. . . . . The true Lord is not merely the Lord of China; he is not only *our* lord, *but he is your lord also*."

In order to show their views more fully, I must quote from another extraordinary document received by Her Majesty's Plenipotentiary at the time:—"But now that you distant English have not deemed myriads of miles too far to come *and acknowledge our sovereignty*, not only are the soldiers and officers of our celestial dynasty delighted and gratified thereby, but even in high heaven itself our Celestial Father and Elder Brother will also admire this manifestation of your fidelity and truth. . . . . We therefore promulgate this new decree" [permitting us to carry on commercial relations as usual, &c.] "of Tai-ping for the

information of you English, so that all the human race may learn to worship our Heavenly Father and Celestial Elder Brother, and that all may know that, wherever our Royal Master is, there men unite in congratulating him on having obtained the decree to rule." Sir George Bonham says in his despatch,—"To this extraordinary document I returned the accompanying reply, which I deemed, under all circumstances, necessary, as, the sooner the minds of these men are disabused in regard to their universal supremacy, the better for all parties:—'I have received your communication, part of which I am unable to understand,' [no wonder] 'and especially that portion which implies that the English are subordinate to your sovereign.'" . . .

In the month of December, 1853, the French war-steamer "Cassini" paid a short visit to the insurgents at Nanking; in May, 1854, the American Minister, Mr. McLane, visited them in the "Susquehanna," and a short time afterwards H.M. steamers "Rattler" and "Styx" renewed the visit on the part of the English. These interviews with the leaders of the insurgents do not seem to have led to any results of importance, if we can judge from the statements which have been published from time to time in the newspapers. While the Chinese have treated the western officials with a certain amount of studied politeness, they have not failed, on all occasions, to assert their own superiority and to demand

that we should acknowledge their universal supremacy. It therefore appears that these visits from officials and ships of war belonging to western nations have not only done no good, but have had a tendency to foster that pride and self-conceit of which the Chinese as a nation have rather more than their fair share.

The religious character of the movement has attracted, as might be expected, much notice from the Christian nations of the West. At one time, during our early acquaintance with the insurgents, it was believed by the more sanguine amongst us that nothing short of a miracle had been performed by the Almighty, and that the millions of China, for ages sunk in idolatry, were now "stretching out their hand to God." But our information on this point was always crude and indefinite. There was, however, no doubt of one thing, namely, that they were busily employed in printing and distributing copies of the Scriptures, that they appeared to be worshipping the same God whom we worship, that they were keeping holy one day in seven, and that their moral code was strict and severe. And it was not to be wondered at if, in many instances, they were induced to put a literal interpretation to certain passages of the sacred writings which they had no one to explain.

But notwithstanding all this, there were many persons amongst the foreign residents in China, and I must confess myself as one of the number, who viewed the religious character of the move-

ment with considerable doubt. This is not the age of miracles, and certainly nothing less than a miracle could account for many thousands of the Chinese being all at once converted to Christianity.

Mr. W. H. Medhurst, Chinese Secretary to the English Government at Hong-kong, who visited Nanking with the "Rattler" and "Styx," put us in possession of an official statement professing to be a few of the tenets of the so-called Chinese Christians. The document in question is certainly an extraordinary one. If we understand it aright, and if it really be what it professes, and an exposition of the religious belief of the insurgents, we must conclude their Christianity to be a sham, and their leaders fanatics or knaves.

In this document, one of the leaders of the insurgents, styled the Eastern Prince, professes to have direct communication with the Supreme Being. He pretends to fall into a trance in the presence of the females of the court, and in that state assumes that he is the Heavenly Father, and gives instructions to be communicated to himself, and also summons the Northern Prince to his presence. The instructions given to himself are afterwards communicated to him by the females, and are to this effect: he is desired to go to court, and reprove the Celestial King, Hung-sew-tseuen, the leader of the insurgents, for harshness to the females of his court and for over-indulgence to his son. When the Northern Prince arrives, the

Heavenly Father has ascended again to heaven, that is, the Eastern Prince is no longer under divine influence, and the whole party get into their sedan-chairs to communicate the divine commands to the Celestial King, Hung-sew-tseuen. Before they start, however, the Heavenly Father descends a second time, and the Eastern Prince falls again into a trance. The Heavenly Father now issues his commands by the lips of the Eastern Prince to the Northern Prince, who kneels reverently in the street to receive them. These are to the effect that He, the Heavenly Father, is to be conveyed to the Hall of Audience in the Celestial King's palace. When they arrive there, the Celestial King is summoned; he with the Northern Prince kneels before the Heavenly Father (the Eastern Prince) to hear his commands. The Heavenly Father now reproved the King in the following words: — "Sew-tseuen, you are very much in fault; are you aware of it?" Sew-tseuen, with the other officers of his court, kneels down before the Heavenly Father and says, "Your unworthy son knows he is in fault, and begs the Heavenly Father graciously to forgive him." The Heavenly Father then said with a loud voice, "Since you acknowledge your fault, you must be beaten with forty blows." When this judgment is pronounced, the Northern Prince and all the officers of the court prostrate themselves on the ground, and, weeping, implore the Heavenly Father to remit the punishment which their master

had deserved, and offer at the same time to receive the blows in his stead. But the Celestial King will not hear of this, and insists on receiving the blows on his own person, prostrating himself for the purpose. The Heavenly Father now relents, and says, "Since you have obeyed the requisition, I shall not inflict the blows." The Heavenly Father then returns again to heaven, and the Eastern Prince is himself once more.

And now it becomes the duty of the Northern Prince to report to the Eastern Prince what the Heavenly Father had communicated, the latter pretending to be profoundly ignorant on the matter. "My fourth Elder Brother," said he, "the Heavenly Father has again troubled himself to come down into the world." The Eastern Prince appeared much pleased and said, "Has he indeed taken the trouble to come down again? Truly he gives himself a great deal of trouble on our account."

The Eastern Prince, having been thus informed of the nature of the divine commands, hastens to communicate them to the Celestial King—a portion of them, however, appear to have been communicated before, during the interview at the palace. The Celestial King receives the heavenly commands with respect and gratitude, and then gives expression to an idea which, if we understand aright, is nothing else than blasphemy. And be it remembered that this is uttered by Hung-sew-tseuen, the leader of this so-called Christian

rebellion, and pupil of our Christian missionaries. The Celestial King then said, "When our Celestial Elder Brother Jesus, in obedience to the commands of our Heavenly Father, came down into the world, in the country of Judea, he addressed his disciples saying, 'At some future day the Comforter will come into the world.' Now I, your second Elder Brother, considering what you, Brother Tsing, have reported to me, and observing what you have done, must conclude that the Comforter, even the Holy Ghost, spoken of by our Celestial Elder Brother, *is none other than yourself*." "Brother Tsing" readily agrees with Hung-sew-tseuen, and now assumes the title of the Comforter or Holy Ghost, and has his name included in the hymn of praise which is chanted morning and evening by the so-called Christian army.

Another of these worthies, styled the Western Prince, pretends to personate our Saviour, "the Heavenly Elder Brother," and utters his exhortations and commands as if they came direct from heaven.

It must be confessed that such professions amongst the leaders of this movement incline us to pause before we can bring our minds to admit them to be Christians. Those who are desirous of obtaining a further account of these men may consult with advantage Captain Fishbourne's 'Impressions of China,' and Mr. Meadows's 'Chinese and their Rebellions.' Foreigners, however, have had no opportunity of making themselves fully

acquainted with this strange people, and I for one am content to suspend my judgment until we have the means of seeing and judging for ourselves. Any change, however, from Buddhism, Taouism, and the apathy with which the Chinese people have shrouded themselves for ages past in so far as religion is concerned, would seem to be desirable. And surely the thousands of copies of the Sacred Scriptures which are not only printed and circulated, but read by the insurgents, will bear fruit at last, although it is much to be feared the precious seed is still sown on stony ground.

Having these views, I fully agree with the following remarks made by a writer in 'The Times' upon this subject:—"It cannot be said at present that the Chinese have learnt the Gospel: but they have at any rate been taught to abandon a system of idolatry, to profess themselves believers in something better, and to appeal to this new law for the correction of social evils. . . . It will, probably, be long before this extraordinary revolution is consummated, but we do not see that the hopes entertained of the eventual conversion of China need be despondingly abandoned."

CHAPTER II.

Objects in visiting China — My boat and boatmen — A groundless alarm — Chinese pilgrims — Chair-bearers — Road to Ayuka's temple — Crowds by the way — Shyness of ladies — Description of scenery — Wild flowers — Tea-farms — Approaches to temple — Ancient tree — Hawkers and their stalls — Scene in temple — Visit to high priest — Shay-le or precious relic — Its history and traditions — A picnic — Character of the people for sobriety — An evening stroll — The temple at night — Huge idols — Queen of Heaven and child — Superstitions of Chinese women.

MY chief object in coming to China at this time was to procure a number of first-rate black-tea manufacturers, with large supplies of tea-seeds, plants, and implements, such as were used in the best districts, for the Government plantations in the north-west provinces of India. Leaving Tai-ping-Wang to fight his battles in the province of Kiang-su and elsewhere, I sailed for the town of Ningpo in the province of Chekiang, and on my arrival at that port started immediately for the tea districts in the interior. I had engaged a small covered boat, such as is used on the canals in this part of the country. It was divided into three compartments: that in the stern was occupied by the boatmen, who propelled the boat by a powerful scull, which worked on a small pivot; the centre was occupied by myself, and the fore-

BOATS USED ON THE RIVERS IN CHINA.

part by my servants. The length of time these boatmen are able to work this scull is very extraordinary. It is customary with them to go on continually both day and night, from the commencement of a journey until its end. When working in rivers, when it is calm, or when the wind is a-head, they have to anchor when the tide is against them, and in this way rest for six hours at a time; but in canals, when the tide is not felt, they go on always both night and day. And what is more wonderful still, the greater part of the work is done by one, and that one is oftentimes a mere boy. The boatman in each boat is generally the owner, and the boy is engaged by him to assist in the working of the boat. Hence the former is the master and the latter the *man;* and as a matter of course the man has to do the greater part of the work. But these boys are well fed and kindly treated by their masters, and they seem happy and contented with their lot in life. This continual working with the scull seems to unfit them for any other kind of work; when on shore they walk badly with a sort of rolling motion, much worse than that of a common sailor, and seem altogether like a "fish out of water."

The distance from the city of Ningpo to the end of the canal and foot of the hills to which I was bound was about ten or twelve miles. As we had travelled all night we reached the end of the canal some time before daybreak. I had slept pretty well on the way, but was now awakened

by the sounds of hundreds of voices, some talking, others screaming at their loudest pitch, and the shrill tones of the women were heard far above those of the men. Half-awake as I was at first, I almost thought I had fallen in with a party of Tai-ping-Wang's army; but my servants and the boatmen soon set me right on that point, by informing me the multitudes in question were on their way to Ah-yuh-Wang, or Ayuka's temple, to worship and burn incense at its shrines. To fall asleep again was now out of the question, owing to the noise and excitement by which I was surrounded. I therefore got up and dressed, and took a seat on the roof of my boat, when I had a moonlight view of what was going on around me. Every boat seemed crowded with pilgrims, the greater part by far consisting of well-dressed females, all in their holiday attire. As daylight dawned the view became more distinct. Each boat was now brought close to the banks of the canal, in order that the passengers might be able to get on shore. I pitied the ladies, poor things! with their small cramped feet, for it was with great difficulty they could walk along the narrow plank which connected the boat with the bank of the canal. But the boatmen and other attendants were most gallant in rendering all the assistance in their power, and the fair sex were for the most part successful in reaching "terra firma" without any accident worth relating. Numerous chair-bearers and chairs lined the banks of the

LADIES AND CHILDREN ON A PILGRIMAGE TO AYUKA'S TEMPLE.

canal, all anxious for hire ; and if the more wealthy-looking did not get conveyances of this kind, it certainly was not the fault of the owners of these vehicles, for they were most importunate in their offers. Indeed so much was this the case, that in many instances under my observation the wavering pilgrim was almost lifted into the chair before he was aware of it. These chairs are extremely light and simple in their construction. They are formed of two long bamboo poles, with a small piece of wood slung between them, on which the traveller sits, and another smaller piece slung lower and more forward, on which he rests his feet. Sometimes, when ladies and children were to be carried, and the weight consequently light, I observed two or three of these seats slung between the poles, and this number of persons carried by two stout coolies with the greatest ease.

After taking my morning cup of tea within sight of numerous plantations of the "herb" itself, which are dotted on the sides of the hills here, I joined the motley crowd, and proceeded with them to Ayuka's temple. When I got outside of the little village at the end of the canal, and on a little eminence beyond it, I obtained a long view of the mountain-road which leads to the temple. And a curious and strange view this was. Whether I looked before or behind me, I beheld crowds of people of both sexes and of all ages, wending their way to worship at the altars of the "unknown God." They were generally divided into small

groups—little families or parties—as they had left their native villages, and most of these parties had a servant or two walking behind them, and carrying some food to refresh them by the way, and a bundle of umbrellas to protect them from the rain. Each of the ladies—young and old—who were not in chairs, walked with a long stick, which was used partly to prevent her from stumbling, and partly to help her along the road. Most of them were dressed gaily in silks, satins, and crapes of various colours, but blue seemed the favourite and predominating one. As I walked onward and passed group after group on the way, the ladies, as etiquette required, looked demure and shy, as if they could neither speak nor smile. Sometimes one past the middle age would condescend to answer me goodhumouredly; but this was even rare. The men on the contrary were chatty enough, and so were the ladies too as soon as I had passed them and joined other groups farther a-head. Oftentimes I heard a clear ringing laugh, after I had passed, from the lips of some fair one who but a minute before had looked as if she had never given way to such frivolity in her life.

But while I am still on a little eminence from which I have been viewing man, let me turn to the other and not less beautiful works of nature. Behind me lay a large and fertile valley, the same through which I had passed during the night, intersected in all directions with navigable canals, and teeming with an industrious and happy

people. As it was now "the bonnie month of May," the rice crops had been some time in the ground, and the valley was consequently covered with dense masses of the loveliest green. Water-wheels were observed in all directions, some worked by men, and other and larger ones by bullocks, and all pouring streams of water upon the rice crops from the various canals which intersect the valley. At the foot of the hills near where I stood were numerous small tea-farms, formed on the slopes, while groups of junipers and other sombre-looking pines marked the last resting-places of the wealthy. The ancient tombs of the Ming dynasty are also common here, but they are generally in a ruinous condition; and had it not been for the huge blocks of granite cut into the forms of men and other animals, of which they are composed, there would have been long ago no marks to point out the last resting-places of these ancient rulers of China. So much for human greatness! Higher up on the hill-sides the ground was cultivated and ready to receive the summer crops of sweet potatoes and Indian corn. Beyond that again were barren mountains covered with long grass and brushwood, which the industry of the Chinese is never likely to bring under cultivation. Both below and above, on the roadsides, in the hedges, and on every spot not under cultivation, wild flowers were blooming in the greatest profusion. In the hedges the last fading blossoms of the beautiful spring-flowering *Forsythia viridis-*

sima were still hanging on the bushes, while several species of wild roses, *Spiræa Reevesiana*, clematises, and *Glycine sinensis*, were just coming into bloom. But look a little higher up to that gorgeously painted hill-side, and see those masses of yellow and white flowers; what are they? The yellow is the lovely *Azalea sinensis*, with its colours far more brilliant, and its trusses of flowers much larger, than they are ever seen in any of our exhibitions in Europe. The white is the little-known *Amelanchier racemosa*. Amongst these, and scattered over the hill-sides, are other azaleas, having flowers of many different hues, and all very beautiful. It is still early morning; the sun is just appearing on the tops of the eastern mountains; the globules of heavy dew sparkle on the grass and flowers; the lark and other sweet songsters of the feathered race are pouring out of their little mouths sweet and melodious songs. I looked with delight on the beautiful scene spread out before me, and thought within myself, if Nature is so beautiful now, what must it have been before the Fall, when man was holy!

As I approached Ayuka's temple I observed other roads leading to the same point, crowded with people such as I have already described, all hurrying on to pay their vows at the altars of Buddha. The scenery in front of the temple, although in a ruinous condition now, at some former time was no doubt very pretty. Entering through an ancient gateway, a paved path led

straight up to the edifice, over an ornamental bridge, which at one time probably spanned the neck of a small lake, in which was cultivated the sacred lotus (*Nelumbium speciosum*), but which was now in these degenerate days allowed to get choked up with weeds. Near this bridge a noble specimen of the camphor-tree (*Laurus camphora*) lay prostrate on the ground, having been blown down by a typhoon many years ago. The curious gnarled and angular branches for which this tree is remarkable when it is alive and standing, seemed more striking in its prostrate and withered condition. For many years this relic of former days had been carefully preserved by the priests, and was now looked upon by them and the visitors as nearly as holy as the temple itself. From the gateway up to the doors of the temple numerous stalls were erected for the sale of candles, joss-sticks, sycee paper, and such things as are used in the worship of Buddha. Others were of a less holy character, and contained cakes and sweetmeats, toys, curiosities, and things likely to attract the notice of the country people. It was curious to mark the enthusiasm with which these pedlers endeavoured to get off their goods. Every passer-by was pressed to buy, and particularly those who had not their hands full of candles, incenses, and other articles which they were supposed to require. In many instances I observed the venders actually laid hold of the people, and almost forced them to spend money on some articles ere they would allow them

to go on. Of course this was done in the most perfect good humour. These pedlers are first-rate physiognomists; they know at a glance those who are likely to become customers, and, should the slightest hesitation be visible on any countenance, that man is doomed to spend his money ere he passes the stall.

I now entered the temple itself, and found it crowded with idolaters. The female sex seemed much more numerous than the male, and apparently more devout. They were kneeling on cushions placed in front of the altars, and bowing low to the huge images which stood before them. This prostration they repeated many times, and when they had finished this part of their devotions they lighted candles and incense, and placed them on the altars. Returning again to the cushion, they continued their prostrations for a few seconds, and then gave way to other devotees, who went through the same forms. Some were appealing directly to the deity for an answer to their petitions by means of two small pieces of wood, rounded on the one side and flat on the other. If on being thrown into the air the sticks fell on the flat side, they had then an assurance of a favourable answer to their prayers; but owing to the laws of gravitation these stubborn little bits of wood fell much oftener on the rounder and heavier side than on the other, and gave the poor heathen a world of anxiety and trouble. Other devotees were busily engaged in shaking a hollow bamboo tube which

contained a number of small sticks, each having a Chinese character upon it. An adept in shaking can easily detach one of these sticks from the others, and when it falls upon the floor it is picked up and taken to a priest, who reads the character and refers to his book for the interpretation thereof. A small slip of paper is now given to the devotee, which he carries home with him, and places in his house or in his fields, in order to bring him good luck. I observed that not unfrequently it was very difficult to satisfy these persons with the paper given to them by the priest, and that they often referred to those who were standing around, and asked their opinion on the matter.

The scene altogether was a striking one, andwas well calculated to make a deep impression on the mind of any one looking on as I was. Hundreds of candles were burning on the altars, clouds of incense were rising and filling the atmosphere; from time to time a large drum was struck which could be heard at a distance outside the building; and bells were tinkling and mingling their sounds with those of the monster drum. The sounds of many of these bells are finer than anything I ever heard in England. Most of the fine ones are ancient, and were made at a time when the arts ranked higher in China than they do at the present day.

In the midst of all these religious services, which candour compels me to say were outwardly most devoutly performed, things were going on amongst the worshippers which as foreigners and

Christians we cannot understand. Many, who had either been engaged in these ceremonies or intended to take their part in them, were sitting, looking on, and laughing, chatting, or smoking, as if they had been looking on one of their plays. And it was not unusual to see a man fill his pipe with tobacco, and quietly walk up and light it at one of the candles which were burning on the altar.

After looking on this curious and noisy scene for a little while, I was glad to leave it for the quieter parts of the building. I went in the first place to pay my respects to the high-priest, and found him occupying some small rooms built at one side of the large temple. With Chinese politeness he received me cordially and made me sit down on the seat of honour in his little room. A little boy who served him brought in a tray, on which a number of teacups were placed filled with delicious tea. Two* of these cups were put down before me, and I was pressed to "drink tea." As the day was excessively warm, the pure beverage was most welcome and refreshing. Reader, there was no sugar nor milk in this tea, nor was there any Prussian blue or gypsum; but I found it most refreshing, for all that it lacked these *civilised* ingredients. The good old man was very chatty, and gave me a great deal of information about himself and the temple. The revenues of the temple were derived partly from certain lands in the vicinity which

* The Chinese generally place *two* cups before a stranger.

belonged to it, and partly from the contributions of devout Buddhists who came there to worship. The high-priest himself also contributed largely to its support. On inquiring how this happened, he informed me that he was obliged to contribute a large sum—I think he said 3000 dollars—before he could be elected to the office he now held, and that he held it for three years only, when his successor would have to contribute a similar sum. This sum was spent in keeping the temple in repair. I understood him to say that the inducement held out to men of his class is high honours at the end of the three years when they retire into private life.

When we had sipped our tea, I then told the high-priest I had heard there was a *Shay-le* or relic of Buddha in the monastery, and expressed a desire to see it. He appeared pleased to find the fame of the relic had reached my ears, and sent immediately for the priest under whose charge it was placed, and desired him to show it to me. I now bade adieu to the old man, and followed my guide to that part of the monastery where the relic was kept. On our way he asked me whether it was my intention to burn incense to Buddha before the box which contained the relic was opened. I replied that not being a Buddhist I could not do that, but I would give him a small present for opening the box—a way of settling the question which seemed to please him quite as well as buying candles and incense to burn at

the shrine. I found the precious relic locked up in a bell-shaped dome. When this was opened I observed a small pagoda carved in wood, and evidently very ancient. It was about ten inches or a foot in height, and four inches in width. In the centre was a small bell, and near the bottom of this the shay-le or relic was said to be placed. "I can see nothing there," said I to my guide. "Oh," said he, "you must get it between you and the light, and then you may see it; it is sometimes very brilliant, but only to those who believe." "I am afraid it will not shine for my gratification then," said I; but I stood in the position my guide indicated. It might be imagination, I dare say it was, but I really thought I saw something unusual in the thing, as if some brilliant colours were playing about it. The Reverend Dr. Medhurst, of the London Missionary Society, who has since visited and examined the relic, could see nothing "because he had no faith;" and if at any time there is anything to be seen, such an appearance could no doubt be easily explained from natural causes. The priest informed me the precious relic had been obtained from the top of a hill behind the temple by their forefathers, who had handed it down with the traditions attending it to the present generation, and that they wanted no further proof of its being genuine.

Shay-le, or precious relics of Buddha, are found in many of the Buddhist temples. In a former work *

* Journey to the Tea Countries of China and India.

I have described two in the celebrated monastery of Koo-shan, near Foo-chow-foo in Fokien. In a note published by the Reverend Dr. Medhurst the history of such relics is given by the Chinese in the following manner :—"The Buddhists say there are 84,000 pores in a man's body, and thus, by following corruption and passing through transmigration, he leaves behind him 84,000 particles of miserable dust. Buddha's body has also 84,000 pores, but by resisting evil and reverting to truth he has perfected 84,000 relics ; these are as hard and as bright as diamonds, affording benefit to men and devas wherein they are deposited. * * * * Eight kings contended for these relics, which were divided into three parts, one being assigned to the devas, one to the nagas, and the third to the eight kings. During Buddha's lifetime he was begging with O-nan in a lane, when they saw two boys playing with earth ; one of them, being struck with the dignified appearance of Buddha, presented him with some pellets of earth, expressing a wish at the same time that he might in future become one of his most zealous worshippers. Buddha then addressed O-nan, saying, 'After my obtaining *nirvaan* (nothingness, *i.e.* death), this child will become a king, ruling over the southern kingdoms, and building pagodas for the preservation of my relics.' This was Ayuka, who afterwards built 84,000 pagodas ; nineteen of these were constructed in China, and one of them was fixed on the snow-hill in the prefecture of

Ningpo, commonly called Yuh-wong. About the time of the Three Kingdoms (A.D. 230) a priest named Hwuy came to Nanking, where he built a shed. The people thought him a strange being, and brought him to Sun-keuen, the ruler of the country, who asked him for the proofs of his religion. Hwuy replied that Buddha left a number of relics, over which Ayuka had built 84,000 pagodas. Sun-keuen thought it was all nonsense, and told him that if he could find a relic he might build a pagoda over it. Hwuy then filled a bottle with water, and offered up incense before it for twenty-one days; at the expiration of that period he heard a sound proceeding from the bottle resembling that of a bell. Hwuy then went to look at it, and perceived that the relic was formed. The next day he presented it to Sun-keuen; the whole of the courtiers examined it, and saw the bottle illuminated with all sorts of brilliant colours. Keuen took the bottle, and poured out its contents into a dish; when the relic came in contact with the dish it broke the vessel to pieces. Keuen was astonished and said, 'That is very curious.' Hwuy then addressed him, saying, 'This relic is not only capable of emitting light, but no fire will burn, nor diamond-headed hammer bruise it.' He then placed the relic on an anvil, and caused a strong man to strike it with all his might, when the hammer and anvil were both broken, and the relic remained uninjured. Keuen then assented to the construction of the pagoda. The Chinese say

that they can sometimes discern the relic illumined with brilliant colours, and as big as a cart-wheel, while the unbelievers can see nothing at all."

Such are the Chinese traditions concerning these so-called precious relics of Buddha, which one meets with so frequently in Buddhist temples, not only in China, but also in India.

After inspecting this precious relic I returned through the various temples, which were still crowded with worshippers, to the open air. As the day was warm, I sought shelter from the scorching rays of the sun in a little wood of bamboos and pines which was close at hand. Here I mixed with groups of worshippers who were now picnicking under the shade which the trees afforded. Each little group had brought its own provisions, which appeared to be relished with great zest. In many instances I was asked to join with them and partake of their homely fare, an invitation which I declined, I trust, in as polite a manner as that in which it was given. Many of them seemed weary and footsore with their long journey, but all were apparently happy and contented, and during the day I did not observe a single instance of drunkenness or any disturbance whatsoever. The Chinese as a nation are a quiet and sober race: their disturbances when they have them are unusually noisy, but they rarely come to blows, and drunkenness is almost unknown in the country districts, and rare even in densely populated cities.

In these respects the lower orders in China contrast favourably with the same classes in Europe, or even in India.

When the sun had got a little to the westward, and his rays less powerful, I left the temple and took my way to the hills. In a few minutes that busy scene of idol-worship which I have endeavoured to describe was completely shut out from my view. As I went along I came sometimes unexpectedly on a quiet and lonely valley where the industrious labourers were busily at work in the fields, or on a hill-side where the natives were gathering their first crop of tea. Here is no apparent want, and certainly no oppression; the labourer is strong, healthy, and willing to work, but independent, and feels that he is "worthy of his hire." None of that idleness and cringing is here which one sees amongst the natives of India, for example, and other eastern nations.

Time passed swiftly by when wandering amongst such interesting scenery, and as evening was coming on I returned to the temple, in which I proposed taking up my quarters for the night. Now the scene had entirely changed: the busy crowds of worshippers were gone, the sounds of bell and drum had ceased, and the place which a short time before was teeming with life was now as silent as the grave. The huge idols—many of them full thirty feet high—looked more solemn in the twilight than they had done during the day.

The Mahârâdjas, or four great kings of Devas, looked quite fierce; Me-lie-Fuh, or the *merciful one*, a stout, jovial-looking personage, always laughing and in good-humour, seemed now to grin at me; while the three precious Buddhas, the past, present, and future, looked far more solemn and imposing than they usually do by day. The Queen of Heaven (Kwan-yin), with her child in her arms, and with rocks, clouds, and ocean scenery in the background, rudely carved in wood and gaudily painted, was the only one that did not seem to frown. What a strange representation this is, rude though it be! some have supposed that this image represents the Virgin Mary and infant Saviour, and argue from this that Buddhism and Christianity have been mixed up in the formation of the Buddhist religion, or that the earlier Buddhists in Tibet and India have had some slight glimmerings of the Christian faith. The traveller and missionary M. Huc is, I believe, of this opinion. At first sight this seems a very plausible theory, but in the opinion of some good Oriental scholars it is not borne out by facts. The goddess is prayed to by women who are desirous of having children, and she holds in her arms a child which she seems in the act of presenting to them in answer to their petitions. Chinese ladies have curious prejudices on this subject: they imagine that by leaving their shoes in the shrine of the goddess they are the more likely to receive an

answer to their prayer. Hence it is not unusual to see a whole heap of tiny shoes in one of these shrines. In former days the custom of throwing an old shoe after a person for luck was not unusual in Scotland, and may have been introduced from that ancient country to China or *vice versâ*.

CHAPTER III.

Tea-gatherers and their wages — Food of Chinese labourers compared with the food of the same class in England — Old city of Tse-kee — Sheds and shops — Market — Mode of skinning frogs — Temple on hill and fine scenery — Lake near north gate — Temples and priests — My servant's mode of answering questions — Chesnut-trees discovered — Introduced to India — Chinese tombs and ceremonies — A widow comes to worship — Beggars and coffins — Different customs in different countries — Reflections.

I MADE Ayuka's temple my head-quarters for several days after the events took place which I have related in the previous chapter. My time was now fully occupied in visiting all the tea-farms in the neighbourhood, and in getting information concerning the cultivation and manufacture of tea. It was the harvest-time for the principal crop of the season, and the natives were observed on every hill-side busily engaged in gathering the leaves. These tea-gatherers were generally seen in small groups consisting of from eight to twelve persons. One old man was usually at the head of each group, the others being women and children. Each had a small stool formed like the letter T, but broad of course at the top, for sitting on while gathering the leaves on the lower sides of the bushes. The foot of the stool being pointed, it was easily forced into

the ground in order to render it steady, and as easily drawn out and carried to a different spot. When these tea-gatherers are hired they are not paid by the day, but by the quantity of leaves they bring in to their employers. In making inquiries on the point I found they were paid at the rate of four and five cash a catty, and that they were able to gather from thirty to forty catty a-day.* In other words, each was able to gather from forty to fifty-three pounds of raw leaves per day, for which was received from 6*d.* to 9*d.*, or thereabouts. But it is only very expert and well-trained hands that can make such a sum as this; children and very old people make, of course, something considerably less. Wages of labourers in the tea districts of China range from 2*d.* to 3*d.* per day with their food, which is almost always furnished by the farmers, and which may cost about 3*d.* or 4*d.* more, making the whole day's labour amount to 6*d.* or 7*d.* The food of these people is of the simplest kind — namely, rice, vegetables, and a small portion of animal food, such as fish or pork. But the poorest classes in China seem to understand the art of preparing their food much better than the same classes at home. With the simple substances I have named the Chinese labourer contrives to make a number of very savoury dishes, upon which he breakfasts or dines most sumptuously. In Scotland, in former days—and I suppose it is much the same now—the harvest

* 100 cash are about 4½*d.* of our money; a catty is equal to 1⅓ lb.

labourer's breakfast consisted of porridge and milk, his dinner of bread and beer, and porridge and milk again for supper. A Chinaman would starve upon such food. Again, if one looks at our sailors making their dinner upon dry salt beef and biscuit, the contrast is equally marked. The dinner of the Chinese sailor is not a whit more expensive, but much more agreeable, healthy, and civilised. Chinese tea-manufacturers whom I have been in the habit of taking to India always asserted they got sick when obliged to live on such food as is given to our sailors, and generally laid in a private stock of various little articles with which they were able to make up a dinner of a very different kind.

Having completed my investigations in this part of the country for the present, I bade adieu to my kind friends in Ayuka's temple, and returned to Ningpo on my way to the old city of Tse-kee. This is a very ancient place, about ten or twelve miles north-west from Ningpo, and near one of the branches of the river which flows past that town. Leaving Ningpo with the first of the flood-tide in the evening, and going on all night, I found myself close by the walls of Tse-kee at daylight next morning. As it was necessary for me to remain in this neighbourhood for some time, I looked out for a pleasant spot for head-quarters. Taking my boat into the canal or moat which has been made round a portion of the city, I found such a place as I wanted near the north gate;

and as my boat was comfortable enough, though small, I determined to live in it, instead of going to a temple or an inn. Leaving my servants to prepare my breakfast and to get their own, I sauntered into the city. I found it a very ancient place, and famous as being the residence of many of the wealthiest persons in this part of China. Its walls seemed to be about three miles in circumference, but they enclosed numerous fields and gardens as well as houses. The dwellings of the rich were mostly surrounded with high walls, and were not visible from the streets. This is a common mode of building, as it secures the privacy of the female members of the family in a country like China, where it is the custom to keep them much secluded.

I had entered the city by the north gate, and in a few minutes had a crowd of people at my heels. "Where had I come from?" "where was I going to?" and "what was I wanting to buy?" were questions which were put on all sides. The crowd appeared to be perfectly good-humoured, and treated me with the greatest deference and respect. Some ran on before me, and seemed to take a great deal of pleasure in spreading the information of my arrival. The consequence was, that every door and window was full of people anxious to get a look at the foreigner. It was perfectly useless to remonstrate or to get angry, so I was all smiles and took everything in good part. Near the centre of the city, and in one of

the principal streets, I found a most excellent market. For fully half a mile this street was literally crowded with articles of food. Fish, pork, fowls, ducks, vegetables of many kinds, and the fruits of the season, lined its sides. Mushrooms were abundant, and excellent, as I afterwards proved by having some cooked. Frogs seemed much in demand. They are brought to market in tubs and baskets, and the vender employs himself in skinning them as he sits making sales. He is extremely expert at this part of his business. He takes up the frog in his left hand, and with a knife which he holds in his right chops off the fore part of its head. The skin is then drawn back over the body and down to the feet, which are chopped off and thrown away. The poor frog, still alive, but headless, skinless, and without feet, is then thrown into another tub, and the operation is repeated on the rest in the same way. Every now and then the artist lays down his knife, and takes up his scales to weigh these animals for his customers and make his sales. Everything in this civilised country, whether it be gold or silver, geese or frogs, is sold by weight.

Raw tea-leaves—that is, just as they had been plucked from the bushes, and unmanufactured—were also exposed for sale in this market. They were sold at from three farthings to five farthings a pound; and as it takes about four pounds of raw leaves to make one pound of tea, it follows that

the price paid was at the rate of threepence to fivepence a pound, but to this must be added the expense of manipulation. In this manner the inhabitants of large towns in China, who have no tea-farms of their own, can buy the raw leaves in the market, and manufacture the beverage for themselves and in their own way.

The streets in the city of Tse-kee are narrow, and the shops for the most part have a mean appearance. The wealthy inhabitants, with whom the city abounds, appear to get their supplies of everything except food from the large cities, such as Ningpo and Hangchow. But food must be supplied on the spot, and hence the necessity for such a fine market as I have noticed. It is here as in western countries—the market takes place in the morning. In the afternoon this busy street was almost deserted: the fishmonger had sold his fish, the butcher his pork; and all that band of rosy-cheeked countrymen who in the morning had been vending their loads of vegetables and fruits had returned to their homes with strings of cash, the proceeds of their sales, in their baskets or slung over their shoulders.

The scenery round the ancient city of Tse-kee is of the most romantic and beautiful description. The city stands on a flat plain, and is surrounded by hills varying in height from two or three hundred to one thousand feet above the level of the plain. Some are crowned with temples having a most imposing appearance in the distance, and from

which the most charming views can be obtained. One of these, and the finest, is near the east gate of the city. It is approached by an avenue of pine-trees, and a broad flight of stone steps leads from the bottom of the hill to its summit, where the temple stands. From the higher rooms of this temple the visitor sees a wide extent of level country, exceedingly fertile and well watered. His eye follows the windings of the Ningpo river for many miles in a westerly direction, until it is lost amongst the distant hills. Canals, many of which are broad and deep, intersect the country in all directions, and afford not only a plentiful supply of water for the irrigation of the rice-crops, but bear on their surface thousands of boats of many different sizes, all hurrying to and fro and carrying on the commerce of the country. It is a pretty sight to see the numerous white or brown sails over the land, bending to the breeze, or flapping about in a calm sunny morning. Looking south and eastward, the eye rests upon the wide plain of Ningpo, and in a clear day the high mountains which bound its furthest sides are distinctly visible.

It is difficult, where all is so beautiful, to fix upon the prettiest spot, but that near the north gate, where my boat lay, appeared to me the most lovely of all. Between the north gate and the hills there is a pretty lake, which is crossed by a causeway with arches and alcoves. This causeway led from the city to a range of temples

situated at the base of the hills. A side view of this causeway, with its round-arched bridge and alcove, the smooth water of the lake, the rich vegetation on its banks, and the temples at the foot of the hills, would form a lovely picture worthy of the pencil of our first European artists. I have looked on this scene in early morning when the mist was rising from the water, at noon on a summer's day when the water appeared to have been melted with the fierceness of the sun's rays, and again at "dewy eve" when all was still, —and a more fairy-like spot it would be most difficult to find.

I found the temple beyond the lake a large building, or rather a series of buildings, in tolerably good repair. Here were a number of priests and their attendants, and no lack of idols of great size. But these I have already noticed in Ayuka's temple, and shall not say anything further concerning them here. The high-priest received me with great kindness, and made me sit down in the seat of honour by his side. A little boy, who was destined one day to become a priest himself, but who was now attending on his superior, was ordered to set tea before us, which he did in the usual style. Our conversation turned, as it frequently did, upon the state of the country and the rebellion. The old man asked me very earnestly as to what I had heard of the Nanking rebels, and whether I thought they would come to Hangchow and Ningpo. I told him he knew quite as

much of their proceedings and intentions as I did, and that with my present knowledge it was impossible to form an opinion on the matter. He said, if they did come to either of the places named, they would not visit Tse-kee—an opinion which I ventured to dispute. I then asked him if he had heard of the massacre of the Buddhist priests on Silver Island, near Ching-keang-foo, the news of which had reached me a short time before. This massacre was reported by some to be the results of intense Christian feeling and hatred of idolatry. The old man had heard of this, but would not allow of the interpretation which was generally put upon the matter. He told me—and he was probably correct—that the priests had been trying to save the lives of some mandarins who had taken shelter in their temples, and that for this sin, and not for idolatry, they were put to death. The subject was evidently one of deep interest to all the Buddhist priesthood, a considerable number of whom now surrounded us as this conversation was going on.

While engaged in this manner with the high-priest the room had gradually become more and more crowded with the inferior priests, with worshippers who happened to be at the temple, and with the servants and labourers who were attached to it. It is a curious fact that, although the Chinese as a nation have a high respect for their superiors, they do not show it in the same manner as we do. Hence it is not unusual for strangers

and servants to crowd into a room where visitors are being received and entertained, and even to take part in the conversation. My own servant Tung-a was amongst the crowd, and was quite a lion for the time. Hundreds of questions were put to him as to my country, the time I had resided in China, and the objects I had in view in visiting the "central flowery land." He did not fail to answer the whole in a most satisfactory manner to himself and his audience, but whether his answers were to be depended upon or not was quite another matter, nor did he seem to care much so long as his interrogators were satisfied. Being engaged during my spare hours in making a collection of the insects of this part of China, Tung-a carried in his hand, in addition to a small cork-lined box and insect-net, a nice-looking bottle with a glass stopper. This was an object of much interest to the priests and their attendants, and was handed about from one to another all over the room. Before taking my leave I presented this bottle to the high-priest, who was quite charmed with my liberality, and almost went down on his knees to thank me. Oftentimes afterwards I renewed my visit to the old man, particularly during the heat of the day, when I was glad to seek shelter from the burning rays of the sun, and always found him kind and obliging. In the autumn of this year I received from him some valuable seeds which are now vegetating both in England and India.

The lower sides of all the hills round this old city are covered with trees, and have a very pretty appearance. The Chinese pine (*Pinus sinensis*), which is grouped about in all directions, attains to a great size; several kinds of oak, both evergreen and deciduous, are also common; but perhaps the most striking of all is the camphor-tree, which with its gnarled and angular branches is quite the monarch of the woods. Amongst these woods I met with the chesnut for the first time in China. This discovery was of great importance, as I was most anxious to introduce this to the Himalayan mountains in India. Many attempts had been made to introduce it from Europe, but they had not succeeded. The seeds of such trees as oaks, chesnuts, tea, &c., retain their vitality for a very short time after they are gathered if they are not sown and allowed to vegetate. It is therefore useless to attempt to send these seeds in dry paper parcels or in hermetically sealed bottles from Europe to the north of India. The chesnuts which I had met with in the markets of China, although excellent for the dessert, were generally too old for vegetating; but now, when I had discovered the locality where they grew, there was no longer any difficulty in procuring them quite fresh. There are two species cultivated on these hills. One is somewhat like the Spanish, and, although probably a different variety, it produces fruit quite equal in quality, if not superior, to the Spanish chesnut. The other is a delicious little kind, bear-

ing fruit about the size and form of our common hazel-nut. Large quantities of both kinds were procured in the autumn of this year, sown in Ward's cases, and sent on to India. Part were sent to Government and part to the Agricultural and Horticultural Society. They vegetated freely during the voyage, and many hundreds of nice healthy young plants reached India in the most perfect condition. The chesnut may now be considered naturalized on the hills of India, and in a few years will no doubt make its appearance in the markets amongst other fruits.

The "Yang-mae," a species of *Myrica*, was also met with on these hill-sides, and some grafted plants secured for India. These are now luxuriating in the north-west provinces. This fine fruit will no doubt succeed admirably in the Himalaya, for already there is a variety—far inferior indeed to the Chinese kind, but yet a plant requiring the same soil and temperature—common on these hills. It is the *Kaiphul* of the hill-tribes of India.

The most beautiful spots on these hill-sides are chosen for the tombs of the dead, which are scattered about everywhere. The sombre pine, the juniper, the arbor-vitæ, and the cypress are generally planted round the graves. As common as these, and equally ornamental, is the *Photinia glabra*, a noble evergreen which in the winter becomes covered with bunches of red berries. The weeping-willow is also sometimes used, and

has a very pretty effect, particularly when one is planted on each side of the tomb. These trees are planted in a half-circle round the grave, leaving the front open. Within this half-circle is the tomb itself, the most common kind being covered with a large mound of earth faced with stone in front, on which the name and age of the deceased are cut and painted. In front of this again is a stone pavement with smooth stone seats, whether destined for the visitor or for the spirit of the departed I cannot tell. Sometimes I met with tombs of the most elaborate workmanship, and constructed in many different ways. Each told its tale of wealth or poverty; some must have cost very large sums, while others consisted of the coffin laid upon the surface of the ground, and thatched with a little straw. It is a pretty sight, and yet a painful one too, to see the relations of the dead visiting the tombs of their ancestors, which they do at stated periods, for the purpose of burning sycee paper and incense, and chanting prayers to the gods or spirits of the departed. Sometimes a mother may be seen with her children, the youngest probably still an infant in her arms, assembled in front of the grave of the husband and father. The widow is wailing and lamenting her bereavement, and the poor little ones look on so seriously, while every now and then they prostrate themselves before the grave. Or, it may be, it is the aged who are paying the same respect to the last resting-place

of those who had been taken away in early life, and to whom they had looked forward as the stay and prop of their declining years. Or again, a solitary individual might be seen performing the same rites — young, middle-aged, or old, as the case might be—which suggested the idea that he was poor and friendless, the last of his race. It has been asserted that there is little genuine feeling in all this, that it is a custom which must be observed, and that it would be just as well if such a custom did not exist. I believe, however, there is as much genuine sorrow amongst the Chinese for the loss of relatives as there is amongst ourselves; and if we consider the way they dote upon their children, and the reverence and love they have for aged parents, we can come to no other conclusion. That in many instances all is mere show and required by custom, I have no doubt. On one occasion, as I was wandering amongst these hills, a chair passed me containing a very beautiful lady dressed in the gayest satin. I caught a slight glimpse of her countenance as she passed, and was so much struck with her beauty that I instantly stood still and looked after the chair. It immediately turned off the little hill-road in the direction of a tomb that had been lately made, where it was set down by the bearers. Following this chair were two female servants and a coolie with a box of clothes, a basket of provisions, and some sycee paper and incense. The lady, on stepping out of the chair, commenced robing herself in deep

mourning by putting on a gown of sackcloth over her gay dress, but on seeing I was looking on she stopped immediately and threw the gown to her attendants, with whom she was laughing and chatting away, as if grief and she were perfect strangers to each other. Anxious as I was to witness her proceedings, I felt it was wrong and indelicate in me to remain in my present position, so I walked onwards until a small hedge and clump of bamboos hid the party from my view. I then turned into the plantation, and selected a spot where through an opening in the foliage I could see all without being seen myself. The handsome widow, for such she apparently was, had again put on her sackcloth robe, her women were standing by her side, and the wailing commenced in the most business-like manner. This continued for nearly half an hour, while at the same time incense was burned, and various tawdry-looking strips of paper were hung about the grave. At last the ceremony was finished, the coarse sackcloth was consigned to the coolie, and the lady, all gay as before, and with but little traces of grief, stepped into her chair and was carried away.

For many weeks after these visits to the tombs numerous long strips of gay-coloured paper are seen hanging about the graves. In my researches amongst these hills I was much struck with one thing, which I must mention here, and from which all may learn a useful lesson. Here and there, amongst those tombs which had been cleaned and

repaired, and which bore all the marks of having been recently visited by relatives, were some from which no friendly hand had cleared away the weeds. Ages ago they had been built without regard to expense, and for many years they had been, no doubt, visited by loving friends, who had burned incense upon them, and strewed them with wild flowers and paper streamers. But now they were going fast to decay; they were not visited or repaired at the usual and stated times; and their tenants had been long since forgotten. And as it had been with these, so it would be with the others which were now so carefully attended to. A few years more, and their tenants too would be forgotten, however rich or however much loved.

When a wealthy Chinese dies at a distance from his home, his body is brought back to his native place by his relations in order that he may sleep with his fathers. In front of an old temple near Tse-kee I observed a number of coffins lying under the verandah, and on inquiry found that they had all been brought from some distance, and had been laid down there until a lucky spot could be found out for their final resting-place. Some had apparently lain here for a long period of time. Under the same verandah, and amongst these coffins, a colony of gipsy beggars had taken up their quarters, which to me had a curious appearance. However, these people seemed to have no supernatural fears of any kind, and were on such friendly terms with their dead companions, that

the tops of the huge coffins were used as supports for their mosquito curtains. "What a traveller's story! Beggars with mosquito curtains,—the living sleeping with the dead!" Even so, gentle reader; we are now in China.

In a country like England we pride ourselves upon our civilization and good taste. But let us fancy a Chinese traveller paying us a visit and writing a description of our grave-yards. How different would his pictures be from those which I have now given, and how horrified would he be with our barbarism and want of taste! "The English," he would say, "do not respect their dead; they crowd them into churchyards in densely populated towns, and plant no pine-trees or wild flowers about their graves. In many instances they even dig them up before they are fully decomposed, in order to make room for others! Their children look upon such places with dread, and will not pass them willingly after nightfall." Such would be his reflections, or at least would have been a few years ago. Let us hope that in a very short period the good sense of the people and the energy of Government will do away with such relics of barbarism.

But what does it matter, says some stern moralist, where one is buried—whether in the deep sea, the crowded city, or amid the beauties of nature on the hill-side? I do not argue the point, but my taste leads me to prefer the customs of the Chinese, where one can sleep in peace after being buried,

where one's grave is looked upon with love and affection, and not with fear; nor would I object to the spot being visited by loving children, who come to shed a few heartfelt tears, and plant a few wild flowers on the tomb of him they loved so fondly.

CHAPTER IV.

Entomology — Chinese ideas respecting my collections — My sanity doubtful — Mode of employing natives to assist me — A scene on returning to my boat — Curious tree — Visit from a mandarin — An endeavour to explain my objects in making collections of natural history — Crowds of natives — Their quietness and civility — Return mandarin's visit — My reception — Example of Chinese politeness — Our conversation — Inquisitiveness of his ladies and its consequences — Beauty of ladies at Tse-kee — Our luncheon and adieu.

The hilly districts amongst which I was now sojourning were particularly rich in beautiful and rare insects. A small bottle, an insect-box, and a net were continually carried both by myself and men, and many were the fine things we captured, as the cabinets of most of the entomologists in Europe can now testify. This proceeding seemed to astonish the northern Chinese beyond measure, and, from the mixture of awe and pity depicted in many a countenance, they evidently thought me a little cracked in the head. The more intelligent amongst them believed I was collecting for medical purposes, and that all my specimens were destined to be chopped up in a mortar and made into pills to be swallowed by the sick. The Chinese have not the slightest idea of the study of entomology, and laughed at me when I attempted to explain to them that insects are collected for such a pur-

pose. Their medicinal value seemed to them a much better reason for the trouble of collecting. Amongst themselves an idea is prevalent that the larvæ of coleopterous and other insects form excellent food to give occasionally to young children, and hence in my rambles I met not unfrequently persons employed in collecting larvæ for this purpose. A species of toad, found in the rotten hollow trunks of trees during the hot months, is eagerly sought after by the young men in the army who are being trained to the use of the bow, and to whose bones and sinews it is supposed to give additional strength. This strange-looking animal sells in the market at from fourpence to eightpence each, but it is extremely rare.

The children in the different villages were found of the greatest use in assisting me to form these collections, and the common copper coin of the country is well adapted for such purposes. One hundred of this coin is only worth about fourpence-halfpenny of our money, and goes a long way with the little urchins. A circumstance connected with transactions of this kind occurred one day, which appears so laughable that I must relate it. As I went out on my daily rambles I told all the little fellows I met that I would return in the evening to the place where my boat was moored, and, if they brought me any rare insects there, I would pay them for them. In the evening, when I returned and caught a glimpse of my boat, I was surprised to see the banks of the stream

crowded with a multitude of people of all ages and sizes—old women and young ones, men and boys, and infants in arms were huddled together upon the bank, and apparently waiting for my return. At first I was afraid something of a serious nature had happened, but as I came nearer I observed them laughing and talking good-humouredly, and guessed from this that nothing had gone wrong. Some had baskets, others wooden basins, others, again, hollow bamboo tubes, and the vessels they carried were as various in appearance as the motley group which now stood before me. "Mâ jung! mâ jung!" (buy insects! buy insects!) was now shouted out to me by a hundred voices, and I saw the whole matter clearly explained. It was the old story, "I was collecting insects for medicine," and they had come to sell them by the ounce or pound. I had unintentionally raised the population of the adjoining villages about my ears; but having done so, I determined to take matters as coolly as possible, and endeavour either to amuse or pacify the mob. On examining the various baskets and other vessels which were eagerly opened for my inspection, what a sight was presented to my view! Butterflies, beetles, dragonflies, bees — legs, wings, scales, antennæ — all broken and mixed up in wild confusion. I endeavoured to explain to the good people that my objects were quite misunderstood, and that such masses of broken insects were utterly useless to me. "What did it signify—they were only for

medicine, and would have to be broken up at any rate." What with joking and reasoning with them, I got out of the business pretty well. As in all cases I found the women most clamorous and most difficult to deal with, but by showing some liberality in my donations of cash to the old women and very young children I gradually rose in their estimation, and at last, it being nearly dark, we parted the best of friends. I have been placed in circumstances somewhat similar on various occasions since, but I have hitherto managed to come safely out of the scrape. Sometimes amongst all this chaff there were grains of wheat, and not the least striking was a beautiful species of Carabus (*C. cœlestis*), which was brought to me at this time, and for which I gave the lucky finder the large sum of thirty cash, with which he scampered off home, delighted with his good luck. Paying away sums like this for insects seemed to confirm the natives in the views they had originally formed respecting my character. The Chinese, however, are as a people eminently practical in all their views, and it mattered not to them whether I was sane or not so long as they got the cash. They now set to collecting in all directions, and brought me many fine things. On returning home to my boat in the evenings I was called to from every hill-side, "Mâ jung! mâ jung!" (buy insects! buy insects!) and then the little fellows were seen bounding down towards the road on which I was walking. This distribution of cash amongst the

children soon made me quite a favourite with their parents, and in my walks in the country I was invited into their houses, where I received much kindness and hospitality. The poorest cottager had always a cup of tea for me, which he insisted on my sittting down and drinking before I left his house. Before leaving this part of the province I distributed a number of bottles, each being about half filled with the strong spirit of the country (samshoo). These were given to those who promised to make collections for me during my absence; they were told to throw the insects into the spirit when caught, and let them remain until I came to claim and pay for them. By this means I was able to add many novelties to my collection when I again visited Tse-kee in the autumn, to form my other collections of plants and seeds.

On one of my excursions amongst these hills I met with a curiously-formed tree, which at first sight seemed to confirm the old Virgilian tale of apples growing upon plane-trees. It was one of those junipers (*J. sphærica*) which grow to a considerable size in the north of China, and which the Chinese are fond of planting round their graves. But although a juniper at the top and bottom, an evergreen tree with large glossy leaves (*Photinia serrulata*) formed the centre. On reaching the spot where it grew, the appearance presented was, if possible, more curious and interesting. The photinia came out from the trunk of the juniper about 12 feet from the ground, and appeared as

if it had been grafted upon it; indeed, some Chinese in a neighbouring village, to whom the tree was well known, did not hesitate to express their belief that such had been the case, but I need scarcely say this was out of the question. Upon a close examination of the point of apparent union, I found that, although the part between stock and graft, if I may use the expression, was completely filled up, yet there was no union such as we see in grafted trees. There could then be only one way of accounting for the appearance which these two trees presented, and which is pretty well shown in a drawing taken by a Chinese artist. The photinia was no doubt rooted in the ground, and had 12 feet of its stem cased in the decayed trunk of the juniper. The apparent union of the trees was so complete, that nothing could be seen of this arrangement; but upon tapping the lower part of the trunk it sounded hollow, and was no doubt decayed in the centre, although healthy enough outside.

Upon showing the accompanying sketch to a learned Chinese, the teacher of Mr. Meadows, at Ningpo, he, like the villagers, fully believed the photinia had been grafted upon the juniper; and further, he informed me it was a common thing in the country to graft the Yang-mae (*Myrica sp.*, a fine Chinese fruit-tree) upon *Pinus sinensis*, and that by so doing the fruit of the Yang-mae became much larger and finer in flavour. Having been engaged in procuring some

Yang-mae trees, which the Government of India was anxious to introduce to the Himalaya, I was somewhat better informed upon this subject than the *learned* Chinaman. I told him the fine variety of Yang-mae was grafted upon the wild kind, which

Remarkable Tree.

the Chinese call the *San* or hill variety (*Myrica sapida*); and further, I showed him some plants which I had just purchased: but all was of no use; he was "convinced against his will," and still firmly believes the Yang-mae is usually grafted on the pine.

Travelling as I was all alone, and engaged in making collections of natural history, the objects of which the natives could not comprehend, it was not to be wondered at if my fame was spread far and wide over the country. I had visits from several mandarins and other wealthy inhabitants of the district, and the way in which some of the more timid of these gentry presented themselves was to me highly amusing. One day, when I was busy in arranging my collections, I heard a stranger's voice calling my servant, and on looking out at the window I observed a respectable-looking man with several attendants within a few yards of my boat. From his manner he was evidently most anxious to see me and what I was after, but at the same time he seemed doubtful of the reception I might give him. My servant having assured him that I was perfectly harmless, he mustered courage at last to come alongside. In the mean time I opened the boat, and invited him to come inside. I suppose my appearance and manners must have been more favourable than he had been led to expect by the report which had reached his ears, for he immediately made me a most polite bow, and accepted my invitation. When I spread out my entomological collections for his inspection, he seemed perfectly astonished. "Did you really get all these in this district?" said he. "Strange, that, although I am a native, yet there are hundreds of them I have never seen before." I ventured to hint that perhaps he had not looked for them,

which he said was very true, and no doubt accounted for his not having seen them. As my boat was made fast to the bank of the canal, we were surrounded by crowds of the natives, who, hearing that I was showing my collections to the mandarin, were all anxious to have a peep. Hundreds of questions were put to each other on all sides as to what I could possibly be going to do with the numerous strange things which I had got in my boxes. The more wise amongst the crowd informed the others that all the insects were collected to be made into medicine, but as to the diseases which they were destined to cure, the wisest amongst them were obliged to plead ignorance. My servants and boatmen were often appealed to for light upon the subject, but they only laughed and confessed their entire ignorance; nor did they take the slightest trouble to convince their countrymen that they were wrong in their conjectures.

When I had shown my collections to my visitor, he put the question which the crowd had been discussing outside, and which discussion he had heard as much of as I had done. Had I entered into the merits of the study of entomology, he most certainly would not have been able to bring his mind to believe I was telling him the truth. If, on the other hand, I had told him I intended to make medicine of my collections, although he would have believed me, yet this would have been untrue. So I thought I might give him another idea which he

would comprehend and appreciate. "In my own land," said I, "many thousand le from this, we have a great and good Queen who delights in the welfare and happiness of her people. For their instruction and amusement a large house* has been constructed—far larger than any of your temples or public buildings which have come under my observation — and into this house have been brought many thousands of plants and animals collected in every country under heaven. Here each species is classified and named by scientific men appointed for the purpose, and on certain days in every week the doors are thrown open for the admission of the public. Many thousands avail themselves of these opportunities, and thus have the means of studying at home the numerous forms of animals and plants which are scattered over the surface of the globe. Many of the insects and shells which you see before you are destined to form a part of that great collection, and thus persons in England who are interested in such things will have the means of knowing what forms of such animals exist in the hills and valleys about Tse-kee." My visitor seemed much interested with the information I gave him, and, although he did not express any surprise, I trust he received a higher idea of our civilisation than he had entertained before. What surprised him more than anything else was my statement that a Queen was the sovereign of England. I have often been

* The British Museum.

questioned as to the truth of this by the Chinese, who think it passing strange, if it be really true.

Before taking his leave he gave me a pressing invitation to pay him a visit at his house in the city on the following day, or on any day it might be convenient for me. I promised to do so, and got my servant to take down his address, in order that we might not have any difficulty in finding his house. The door of the boat was now thrown open, and I handed him out to the banks of the canal. Here we made most polite adieus in the most approved Chinese style, in the midst of a dense crowd, who had been attracted by the rank of my visitor, and partly perhaps by the reports which had been spread about myself.

The crowd which had now collected was of a mixed character; but owing, I suppose, to the number of wealthy and respectable people in the city, the individuals were generally well-dressed and clean, and perfectly respectful and civil in their demeanour. Applications were made to me on all sides for permission to enter the boat and inspect my collections. This being entirely out of the question, I had a portion of the cover removed in order that their curiosity might be satisfied from the banks of the canal. Entering the boat myself, I opened box after box, and spread out my collections before them. My table, bed, the floor of the boat, and every inch of space was completely covered with examples of the natural history of the place. "Can all these things have been col-

lected here?" was on every lip; "for many of them we have never seen, although we are natives of the place and this is our home." And when I pointed out some of the more remarkable amongst the insects, and gave them the names by which they are known to the natives, I was complimented and applauded on all sides. "Here," said I, for example, "is a beautiful *Ka-je-long* (carabus), which I am anxious to get more specimens of; if you will bring some to me I shall pay you for them. That Kin-jung (golden beetle) you need not collect, for it is common in every hedge." "*Oo-de-yeou?*"—Do you want butterflies? "No," I replied, "for you cannot catch them without breaking them." And so the conversation went on, every one being in the best possible humour. When I had shown them the greater portion of my collections, the cover of the boat was let down, and everything put away into its proper place. I was now anxious to disperse the crowd, and for that purpose informed them that, as the afternoon was getting cool, I was now going out to make further additions to my collections. "Thank you, thank you," said many of them, making at the same time many most polite bows after the manner of the country, which I did not fail to return. And so we parted the best of friends. When I returned from my excursion it was nearly dark; the crowd had all gone to their homes, and quietness now reigned where all had been noise and bustle a few hours before. One or two little boys

were sitting on the banks of the canal waiting my arrival, in order to dispose of some insects which they had been lucky enough to capture during the day. And so I went on from day to day, gradually increasing my collections, with the help of hundreds of little boys, who were delighted to earn a few "cash" so easily. The effect produced upon the villagers was also most marked, and I was welcomed wherever I went, and everywhere invited to "come in, sit down, and drink tea." This picture is not very like many which have been given of China and the Chinese, but it is true to nature nevertheless. I trust it may give a higher idea of the civilisation of this people than we are accustomed to form from the writings of those whose principal knowledge was derived from views at the great southern seaports of the empire.

The day after that on which I had been honoured with a call from the mandarin, I dressed with more than ordinary care, sent for a sedan-chair, and set out to return his visit. When I arrived at his house I found that he was expecting me. He was dressed in a long gown, bound round the waist with a belt which had a fine clasp made of gold and jade-stone, and on his head was a round hat and blue button. He received me with many low bows in the Chinese manner, which I returned in the same way. He then led me into a large hall, and invited me to take the seat of honour. In all the houses of the wealthy

there are two raised seats at the end of the reception-room, with a table between them. The seat on the left side is considered the seat of honour, and the visitor is invariably pressed into it. Scenes which seem most amusing to the stranger are always acted on an occasion of this kind. The host begs his visitor to take the most honourable post, while the latter protests that he is unworthy of such distinction, and in his turn presses it upon the owner of the mansion. And so they may be seen standing in this way for several minutes before the matter is settled. It is the same way when a man gives a dinner; and if the guests are numerous, it is quite a serious affair to get them all seated. In this case it is not only the host and his household who are begging the guests to occupy the most honourable seats, but the guests themselves are also pressing these favoured places upon each other. Hence the bowing, talking, sitting down, and getting up again, before the party can be finally seated, is quite unlike anything one sees in other parts of the world, and to the stranger is exceedingly amusing, particularly if he does not happen to be hungry.

After duly expressing my unfitness to occupy the left-hand seat, and attempting to take the other, I was at last forced into the seat of honour, the mandarin himself taking the right-hand one. As soon as we were seated a servant came in with several cups of tea upon a round wooden tray, which cups he placed upon the table between us.

Another servant presented himself, bringing a handsome brass pipe with a long bamboo stem, which he presented to his master. My host handed it immediately over to me, and begged I would use it, assuring me at the same time that the tobacco was the best which could be had in Ningpo. I declined the invitation, but took a cigar out of my pocket, and returned the compliment which he had just paid me. He informed me he had once tried a cigar, but that it was too strong for him; so we compromised matters by each smoking what he had been accustomed to—he his long bamboo pipe, and I my cigar. As we sat and sipped our tea—a delicious kind of Hyson Pekoe—he asked me many questions concerning my country and its productions. Our steamers and ships of war he had seen at Ningpo, and he owned they had pleased him greatly. "To be able to go against wind and tide was certainly very wonderful." But when I told him that by means of balloons we could rise from the earth, and sail through the air, he looked rather incredulous, and with a smile on his countenance asked me whether any of us had been to the moon.

While this conversation was going on, a large crowd had assembled in the court, and many of them were pressing into the reception-hall, in which we were seated. The numerous servants and retainers of the mandarin were also inside, and even sometimes took a share in the conversa-

tion which was going on; nor did this seem to give any offence to their superior.

On one side of the room there was a glass window having a gauze or crape curtain behind it, and apparently constructed to give light to a passage leading to some of the other parts of the mansion. While sitting with my host I had more than once observed the curtain move and expose a group of fair faces having a sly peep at me through the window. These were his wives and daughters, whom etiquette did not permit to appear in public or in the presence of a stranger. I did not appear to notice them—although I saw them distinctly enough all the time—for had I done so they would have disappeared immediately; and as one rarely has an opportunity of seeing the ladies of the higher classes in China, I was willing to look upon their pretty faces as long as possible. A circumstance occurred, however, which put a speedy end to their peep-show, and for which they had no one but themselves to blame. Whether they had fallen out amongst themselves about places at the window, or whether it was only a harmless giggle, I cannot tell—it sounded very like the latter; but the noise, whatever it was, caught the ear of their lord and master, who turned his head quickly to the window in question, and darted a look of anger and annoyance at the unfortunates, who instantly took to their heels, and I saw them again no more.

The ladies in this part of China are famed for

their beauty. It is a curious and striking fact that in this old city and its vicinity one rarely sees an unpleasing countenance. And this holds good with the lower classes as well as it does with the higher. In many other parts of China women get excessively ugly when they get old, but even this is not the case at Tse-kee. With features of more European cast than Asiatic, and very pleasing, with a smooth fair skin, and with a slight colour in their cheeks, just sufficient to indicate good health, they are almost perfect, were it not for that barbarous custom of compressing the feet. Perhaps I ought to add, that, from the want of education—and this applies to females generally in China—there is a want of an intellectual expression in the countenance which renders it, in my opinion, less beautiful than it would otherwise be.

I had now been chatting with my acquaintance for more than half an hour, and thought it time to take my leave. But when I rose for this purpose he informed me he had prepared luncheon for me in another room, and begged I would honour him by partaking of it before I went away. I tried to excuse myself, but he almost used force in order to induce me to remain. He now led me into a nicely furnished room, according to Chinese ideas, that is, its walls were hung with pictures of flowers, birds, and scenes of Chinese life. It would not do to criticise these works of art according to our ideas, but nevertheless some of

them were very interesting. I observed a series of pictures which told a long tale as distinctly as if it had been written in Roman characters. The actors were all on the boards, and one followed them readily from the commencement of the piece until the fall of the curtain. Numbers of solid straight-backed chairs were placed round the room, and a large massive table occupied its centre. This table was completely covered with numerous small dishes, containing the fruits of the season and all sorts of cakes and sweetmeats, for which the large towns in this province are famed. In addition to these there were walnuts from the northern province of Shantung, and dried Leechees, Longans, &c., from Fokien and Canton. Then there were many kinds of preserves, such as ginger, citron, bamboo, and others, all of which were most excellent. A number of small wine-cups, made of the purest china, were placed at intervals round the table.

Several of the old gentleman's friends had now joined us, and we took our places round the table with the usual ceremony, each one pressing the most honourable place upon his neighbour. The day was excessively warm, and I felt very little inclination to eat, but I was pressed to do so on all sides. "Eat cakes," said one; "Eat walnuts," said another; "Drink wine," said a third; and so on they went, asking me to partake of every dish upon the table. It was useless to refuse, for they seized hold of the different viands and heaped

them on my plate and on the table at its side. Various kinds of Chinese wines, hot and cold, were also pressed upon me, some of which were palatable, but scarcely suited to the English taste. I took a little of each in order to please my entertainer, and then confined myself to tea, which was also set before us.

I had now prolonged my visit much beyond the time I had set apart for it, and quite as long as politeness demanded. But time spent in this manner was not altogether unprofitable, inasmuch as one gets an insight into Chinese life and manners which we cannot acquire in the streets or on the hill-side. My kind host and his friends accompanied me to the outer door of the mansion, and, with the palms of our hands laid flat together and held up before us, we bowed low several times, muttered our thanks, and bade each other farewell.

CHAPTER V.

Visit a collector of ancient works of art — His house and garden — Inspect his collections of old crackle china and other vases, &c. — Fondness of Chinese for their own ancient works of art — Description of ancient porcelain most prized by them — Ancient enamels — Foo-chow enamels — Jade-stone — Rock crystal — Magnetic iron and other minerals — Gold-stone — Red lacquer and gold japan — Porcelain bottles found in Egyptian tombs — Found also in China at the present day — Age of these — Mr. Medhurst's remarks.

A SHORT time after the events took place which I have related in the last chapter, and before leaving this part of the country, I paid a visit to another Chinese gentleman, whose acquaintance I had formerly made in an old curiosity shop in Ningpo. Like myself he was an ardent admirer and collector of ancient works of art, such as specimens of china, bronzes, enamels, and articles of that description. Neither of us collected what are commonly known as *curios*, such as ivory balls, grotesque and ugly carvings in bamboo or sandal-wood or soapstone, and such things as take the fancy of captains of ships and their crews of jolly tars when they visit the Celestial Empire. Above all things, our greatest horror was modern china-ware, an article which proves more than anything else in the country how much China has degenerated in the arts. The venders of such things

as we were in the habit of collecting knew us both well, and not unfrequently made us pay for the similarity of our tastes. Oftentimes I was informed, on asking the price of an article, that my Tse-kee friend was anxious to get it, and had offered such and such a price, and I have no doubt the same game was played with him. That what they told me was sometimes true I have no doubt, for in more than one instance I have known specimens purchased by him the moment he heard of my arrival. But for all this rivalry we were excellent friends, and he frequently invited me to visit him and see his collections when I came to Tse-kee.

Curious Pilgrim-shaped Bottle, enamelled with Butterflies, &c.

I found him the owner and occupant of a large house in the centre of the city, and apparently a man of considerable wealth. He received me with the greatest cordiality, and led me in the usual way to the seat of honour at the end of the reception-hall. His house was furnished and ornamented with great taste. In front of the room in which I had been received was a

little garden containing a number of choice plants in pots, such as azaleas, camellias, and dwarfed trees of various kinds. The ground was paved with sandstone and granite, and, while some of the pots were placed on the floor, others were standing on stone tables. Small borders fenced with the same kinds of stone were filled with soil, in which were growing creepers of various kinds which covered the walls. Here were the favoured *Glycine sinensis*, roses, jasmines, &c., which not only scrambled over the walls, but were led inward and formed arbours to afford shade from the rays of the noon-day sun. In front of these were such things as Moutans, *Nandina* (sacred bamboo of the Chinese), *Weigela rosea*, *Forsythia viridissima*, and *Spiræa Reevesiana*. In opposite corners stood two noble trees of *Olea fragrans*, the celebrated "Kwei-hwa," whose flowers are often used in scenting tea; while many parts of the little border were carpeted with the pretty little *Lycopodium cæsium*, which I introduced to England some years ago. This pretty fairy-like scene was exposed to our view as we sat sipping our tea, and with all my English prejudice I could not but acknowledge that it was exceedingly enjoyable.

The reception-room was hung with numerous square glass lanterns gaily painted with "flowers of all hues;" several massive varnished tables stood in its centre, while a row of chairs was arranged down each side. Between the chairs stood small square tables or tepoys, on some of

which were placed beautiful specimens of ancient china vases. Everything which met the eye told in language not to be mistaken that its owner was not only a man of wealth, but of the most refined taste.

After a few commonplace civilities passing between us I expressed a wish to inspect his collections. He led me from room to room and pointed out a collection which was enough to make one's "mouth water." In some instances his specimens stood on tables or on the floor, while in others they were tastefully arranged in cabinets made expressly for the purpose of holding them. He showed me many exquisite bits of crackle of various colours —grey, red, turquoise, cream, pale yellow, and indeed of almost every shade. One vase I admired much was about two feet high, of a deep blue colour, and covered with figures and ornaments in gold; another of the same height had a

Porcelain Vase enamelled with figures of Animals and Plants.

white ground with figures and trees in black, yellow, and green—rare and bright colours lost now to Chinese art, and never known in any other part of the world.

In one of the rooms I observed some handsome specimens of red lacquer most elaborately and deeply carved, and also fine pieces of gold japan. There were also numerous bronzes and enamels on copper, which my friend informed me were from 800 to 1000 years of age. His collections of jades and agates was also extensive and valuable.

Taking the collection as a whole, it was the finest I had ever seen, and was a real treat to me. On going round the different rooms I observed more than one specimen I had been in treaty for myself, and I thought I could detect a good-humoured smile upon my friend's countenance, as the same idea was passing through his mind which was passing through my own.

On returning to the reception-room I found one of the tables covered with all sorts of good things for luncheon, which I was now asked to partake of. It was, however, getting late in the afternoon, and near my own dinner-hour, so I begged myself off with the best grace possible, and with many low bows and thanks took my leave much gratified with what I had seen.

It is well known that the Chinese value ancient works of art, but they differ from western nations in this, that the appreciation of such articles is confined to those of their own country. As a

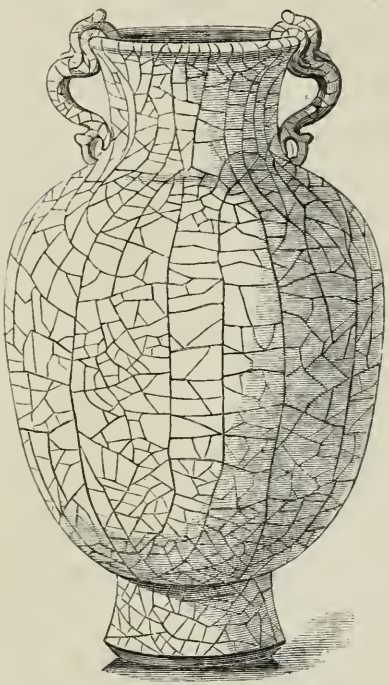
general rule they do not appreciate articles of foreign art, unless such articles are useful in daily life. A fine picture, a bronze, or even a porcelain vase of "*barbarian*" origin, might be accepted as a present, but would rarely be bought by a Chinese collector.

But while they are indifferent about the ancient works of art of foreign countries, they are passionately fond of their own. And well they may, for not only are many of their ancient vases exquisite specimens of art, but they are also samples of an art which appears to have long since passed from amongst them. Take, for example, their modern porcelain, examples of which may be seen in almost every tea-shop in London. The grotesque figuring is there it is true, but nowhere do we find that marvellous colouring which is observed on their ancient vases. I often tried to find out whether as a nation they had lost the art of fixing the most beautiful colours, or whether in these days of cheapness they would not go to the expense. All my inquiries tended to show that the art had been lost, and indeed it must be so, otherwise the high prices which these beautiful things command would be sure, in a country like China, to produce them.

Without coloured drawings it is difficult to give the general reader a correct idea of what these specimens are which are so much prized by the Chinese; and although there are some valuable private collections in England, yet our museums,

to which the public have access, are but meagrely supplied. My descriptions, however, will probably be understood by collectors of such articles in this country.

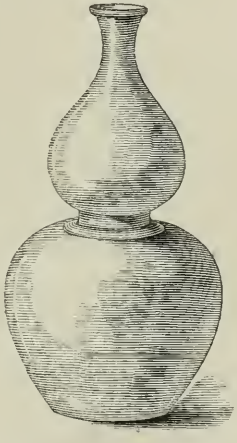
To begin with what is called old crackle porcelain by collectors.—The Chinese have many kinds of this manufacture, some of which are extremely rare and beautiful. In the whites and greys the crackle is larger, and the older specimens are often bound by a metallic-looking band, which sets off the specimens to great advantage. White and grey are the common colours amongst modern crackle — a manufacture not appreciated either by the Chinese or ourselves —but the latter is easily known from its inferiority to the more ancient. The yellow and cream-coloured specimens are rare and much prized—these are seldom seen in Europe. The greens, light and dark, turquoise, and reds are generally finely glazed, and have the crackle-lines small



Vase of Sea-green Crackle.

and minute. In colouring these examples are exquisite, and in this respect they throw our finest specimens of European porcelain quite into the shade. The green and turquoise crackle made in China at the present day are very inferior to the old kinds. Perhaps the rarest and most expensive of all ancient crackles is a yellowish stone-colour; in my researches I have seen only

Oviform Bottle of rare turquoise colour.



Gourd-shaped Bottle of yellowish stone-colour Crackle.

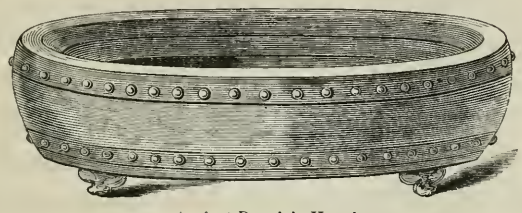
one small vase of this kind, and it is now in my collection.

Of other ancient porcelain (not crackle) prized by the Chinese, I may mention the specimens (generally vases) with a white ground, enamelled with figures of various colours, as green, black, and yellow. It is a curious fact that the attempts made at the present day by porcelain manufacturers to fix such colours invariably fail.

The self-coloured specimens, such as pure whites, creams, crimsons, reds, blues, greens, and violets, are very fine, and much prized by Chinese collectors. Some exquisite bits of colouring amongst this class may be met with sometimes in their cabinets, and also in old curiosity shops. I purchased a vase in Canton about fourteen inches high, coloured with the richest red I had ever seen. I doubt much if all the art of Europe could produce such a specimen in the present day, and, strange though it may appear, it could certainly not be produced in China.

But the most ancient examples of porcelain, according to the testimony of Chinese collectors, are in the form of circular dishes with upright sides, very thick, strong, and heavy, and invariably have the marks of one, two, or three, on the bottom, written in this form, II, III. The colours of some of these rare specimens, which have come under my observation, vary; but the kinds most highly prized have a brownish-yellow ground, over which is thrown a light shot sky-blue, with here and there a dash of blood-red. The Chinese tell us there are but a few of these specimens in the country, and that they are more than a thousand years old. A specimen shown me by a Chinese merchant in Canton was valued at three hundred dollars! In endeavouring to make a dealer lower his price for one in Shanghae, he quietly put it away, telling me at the same time that I evidently did not understand the value of

the article I wished to purchase. It was with some difficulty I got him to produce it again, and eventually I procured it for a much less sum than I could have done in Canton.



Ancient Porcelain Vessel.

Within the last few years the attention of collectors in this country has been drawn to the ancient enamels of China. Many fine specimens were seen in the Great Exhibition of the Works of Art of all Nations in Hyde Park, and since that time a number of specimens have found their way into Europe. The specimens to which I allude have the enamel on copper, beautifully coloured and enlivened with figures of flowers, birds, and other animals. The colouring is certainly most chaste and effective, and well worth the attention of artists in this country. According to the testimony of the Chinese, this manufacture is of a very early period; no good specimens have been made for the last six or eight hundred years.

In the province of Fokien I met with some ancient bronzes, beautifully inlaid with white metal or silver. These were rarely seen in any other part of China. The lines of metal are small and delicate, and are made to represent flowers, trees,

animals of various kinds, and sometimes Chinese characters. Some fine bronzes, inlaid with gold, are met with in this province. As a general rule, Chinese bronzes are more remarkable for their peculiar, and certainly not very handsome, form than for anything else. There are, however, many exceptions to this rule.

Ancient Vase enamelled on Metal.

The curiosity-shops, which are met with in all rich cities, as well as the cabinets of collectors, are generally rich in fine specimens of the jade-stone cut into many different forms. The clear white and green specimens are most prized by collectors. Considering the hardness of this stone, it is quite surprising how it is cut and carved by Chinese workmen, whose tools are generally of the rudest description. Fine specimens of rock-crystal, carved into figures, cups, and vases, are met with in the curiosity-shops of Foo-chow-foo. Some of these specimens are white, others golden-yellow, and others again blue and black. One kind looks as if human hair was thrown in and crystallized. Imitations of this stone are common in Canton

made into snuff-bottles, such as are commonly used by the Chinese.

Amongst other stones and minerals which are found amongst the Chinese are lapis-lazuli, malachites, magnetic iron, and numerous other samples of the rarer productions of the country. But the most curious and most expensive of all is what is called gold-stone. This is an article of great beauty, and very different from the imitation kinds which are made in France, and largely exported to India. Samples of the imitation frequently find their way to Canton, but are little valued by the natives. Most of the Chinese, learned in such matters, with whom I came in contact, affirmed the true gold-stone to be a natural production, and said it came from the islands of Japan. It is very rare in China; I have not met with it in India; and whether it be a natural production or a work of art, it is certainly extremely beautiful. My friend Mr. Beale, of Shanghae, who has some fine specimens, presented one to me for the purpose of having it examined in London, but I have not yet had time.

Specimens of red lacquer, deeply carved with figures of birds, flowers, &c., and generally made in the form of trays, boxes, and sometimes vases, are met with in the more northern Chinese towns, and are much and justly prized. What is called "old gold japan" lacquer is also esteemed by Chinese connoisseurs, and the specimens of this are comparatively rare in the country at the present day.

These are a few of the principal ancient works of art met with in the cabinets of the Chinese and in the old curiosity-shops which we find in all large towns.

According to the united testimony of my Chinese friends, most of the porcelain I have noticed is of a date much more ancient than those bottles which have been found from time to time in Egyptian tombs. I have in my possession examples of these bottles found in China—generally in doctors' shops —identical in form, no doubt of the same age, and having the same inscriptions on them as those found in Egypt, and from all that I can learn they are not older than the Ming dynasty. An article on the proceedings of the "China branch of the Royal Asiatic Society," by W. H. Medhurst, Esq., her Majesty's Consul at Foo-chow-foo, proves this most satisfactorily, by showing that the inscriptions are portions of poetical stanzas by standard and celebrated Chinese authors who flourished about that time. As the concluding part of Mr. Medhurst's paper bears somewhat upon the matters I have been discussing, I shall take the liberty of introducing it in this place.

"I have not been able to ascertain anything equally satisfactory regarding the discovery of porcelain. The earliest notice of its existence, as a ware, that I can find, occurs in a poem by one Tsow-yang, a worthy who lived in the reign of Wăn-te, of the Han dynasty, 175-151 B.C.; but it is only casually mentioned as 'green porcelain.'

Pan-yŏ, a writer of the reign of Tae-che, of the Tsin dynasty, A.D. 260-268, speaks of 'pouring wine into many-coloured porcelain cups;' and the biography of Ho-chow, an eminent character of the Suy dynasty, A.D. 608-622, tells us that its hero restored the art, then long lost in China, of making *Lew-le*, a sort of vitreous glaze, by constructing it of porcelain. Writers of the Tang and Sung dynasties mention it oftener, its use having perhaps become more general in their time. I should, therefore, infer that the manufacture was not known previously to the first-mentioned date, as it is not probable that so useful and valuable a ware would have escaped historical or casual notice, had it existed in sufficient quantity to allow of its being applied to the manufacture of common bottles.

"I need only add that I have trusted in no instance to hearsay evidence in bringing forward the information I have herein collected, but have carefully examined each authority myself previously to recording it upon paper; and perhaps it may not be out of place for me to remark in conclusion, that my teacher scouts the idea of associating these bottles with the Pharaonic epoch as utterly visionary and absurd, it being impossible, he says, that vessels composed of a ware universally acknowledged to be no older than the Han dynasty, and inscribed with quotations from verses that cannot, if the history of Chinese poetry be true, have been written before the Tang dy-

nasty, could have found their way into tombs which were contemporary with the earliest recorded events of Chinese chronology. He is, on the contrary, decidedly of opinion that the bottles in question were manufactured during the Ming dynasty."

Bottle, same as found in Egyptian Tombs.

CHAPTER VI.

Boat-travelling — Unsettled state of the country — A midnight alarm — Old quarters at Tein-tung — A good Buddhist priest — Chinese farmers — Their wives and families — Chinese women's passion, and its effects — Women's curse — The author is seized with fever — A native doctor and his mode of treatment — Method of taking honey from bees — Mosquito tobacco — Its composition and manufacture.

The scenes and adventures which I have endeavoured to describe in the previous chapters, such as making collections of insects and other objects of natural history, paying and receiving visits from Chinese friends, and examining collections of ancient works of art, although noted down in order to give an idea of the manners and customs of the most wonderful people on the surface of the globe, were merely my amusements in the midst of other and far more important labours. The country was examined for many miles in all directions, and arrangements made with the small farmers for large supplies of seeds of the tea-plant and other fruit and forest trees which were likely to be valued in India. My mode of travelling by boat, in a country where the canals and rivers are the highways, was well adapted to the ends I had in view. I was, as it were, always at home; my bed, my clothes, and my servants were always

with me. I could go from valley to valley and from hill to hill; I could "bring up" when it was necessary; and when my labours were finished in one place, I could go on, bag and baggage, to another. Whenever the country was known to me, or supposed to contain objects of little interest, I used to travel by night and work during the day. Thus my boatmen and myself worked alternately; they slept by day and sailed by night, while I slept by night and worked by day. At this time the country was in a very unsettled state, owing to the rebellion which was raging in many of the districts in the adjacent provinces, and hundreds of loose characters, honest enough when the Government was strong, were now committing acts of robbery upon the quiet and inoffensive natives. Very few Chinese travelled by night, unless in large bands, whose numbers were considered a sufficient protection. My boatmen often remonstrated when they got the order to move on, telling me it was not the labour they were afraid of,—they were willing to work,—but that we should be attacked and robbed, or perhaps murdered. These little scenes were to me oftentimes exceedingly amusing. I would first hear the boatman come to the bows where my headman Tung-a was, and in a low whisper communicate his fears to him, and ask him at the same time to use his influence with me in order that we might remain where we were until daylight. Then after a conference of this kind Mr.

Tung-a would present himself with a very grave face, and inform me that the Lou-da (head boatman) was afraid to go onwards on account of robbers whom we were likely to meet during our night-journey. We then held a little council of war, consisting of the boatmen—including the boy I have already noticed, who, by the by, gave his opinion like a man — my servants, and myself. After a careful examination into the matter, if I saw their fears arose from natural timidity more than from any real danger, I used to point to my gun-case, and tell them not to be afraid; and so in nine cases out of ten our little council broke up with a determination to go on. But it would have been the height of folly for a solitary traveller in a little-known country to despise warnings of this kind, more particularly when the unsettled state of the empire was taken into consideration. The boatmen had the strictest orders to awake me should any suspicious vessel make her appearance, and my rest was frequently disturbed during the night, often, no doubt, without the slightest reason. They were also to let the strangers know they had a "Hong-mow-jin" (the name by which foreigners are known in this part of China) in the boat who had fire-arms with him which he was prepared to use in case it was necessary. From an intimate knowledge of the natives in Chekiang, I considered these two pieces of information of great value in preventing an attack, for most of the natives here, unless they

are very hardened indeed, have a kind of superstitious dread of foreigners and foreign fire-arms.

Amongst many false alarms I had at this time, there was one which I thought would have proved rather serious. It was about midnight, and the night was excessively dark. We were all sound asleep, except one boatman, who was sculling the boat—if indeed he was not as sound as any of us, for these fellows go asleep at the scull like an Indian at the punka — when we experienced a sharp shock from our boat coming in contact with another. I was up in an instant, thinking the long-threatened night attack had come at last. Throwing the moveable portion of the roof of my boat on one side, I saw our antagonist lying alongside of us. My men were out on the bows, and my boatmen at the stern, ready to repel the invaders. Through the darkness I could discern a number of people crowding the other boat, but not attempting to board us. I immediately hailed them, and asked them who they were, and why they had run against us. They replied they were Ningpo men, that they were not robbers, and that the accident had occurred owing to the darkness of the night. We now set to work and got the boats clear, and each proceeded on his journey. I believe those who gave us the alarm were more frightened than we were, and that each took the other for the pirate. My servants and boatmen were, however, of a different opinion; they believed them to be thieves, and said that had

a Chinese been in our boat instead of a foreigner he would have gone away rather the poorer for the encounter. The true state of the case must, I am afraid, remain for ever a mystery; but it does not signify much.

As the summer advanced — it was now the month of July—the weather became too hot to live in boats. The thermometer frequently stood at 100°, and once or twice rose to 110°, in the shade. It was time, therefore, to look out for other quarters, and, as I had a good deal to do in the districts to the south of Ningpo, I determined on taking up my quarters in the old Buddhist temple of Tein-tung. I have already described this ancient place in my 'Wanderings in China,' to which the reader who wishes to know more about it is referred. It is situate amongst the mountains some twenty miles south-east from Ningpo, and in the midst of an extensive tea-country, which is becoming of more importance every day on account of the large demand for this article which has sprung up in Shanghae since that port was opened to foreign trade. When I arrived at Tein-tung I took up my quarters with the priest with whom I had lived formerly—a man with one eye, who is now well known to foreigners who visit the temple. He is a very superior specimen of the Buddhist priesthood, intelligent and strictly honest and honourable. I have often left things in his care for long periods of time, and felt as certain of having

them returned to me as if they had been in the Bank of England. A man of this kind was invaluable, as I was thus enabled to make his house a sort of head-quarters for my collections in the province until they could be conveyed to Shanghae for shipment to India or to Europe.

On the present occasion he seemed delighted to see me again, and gave me a hearty welcome. Having established myself in my old quarters, I took the mornings and evenings for my outdoor excursions, and generally stopped in the house during the heat of the day. In this way, with the help of my good friend the priest, I entered into engagements with many of the small farmers for supplies of tea-seeds to be gathered in the following autumn as soon as they were ripe. In a short time all the little boys and girls in the country were making collections of insects, land-shells, and other objects of natural history for me, and were delighted with the few cash they were able to earn in this manner. I was thus fully employed even during the heat of the day, when it would have been imprudent to stir abroad.

The farmers in China, as a class, are highly respectable, but, as their farms are all small, they are probably less wealthy than our farmers in England. Each farm-house is a little colony, consisting of some three generations, namely, the grandfather, his children, and his children's children. There they live in peace and harmony together; all who are able work on the farm, and

if more labour is required, the stranger is hired to assist them. They live well, dress plainly, and are industrious, without being in any way oppressed. I doubt if there is a happier race anywhere than the Chinese farmer and peasantry. Being well known in this part of the country, and having always made it a point to treat the people well, I was welcomed wherever I went. I began to feel quite at home in the farmers' houses. Here the female members of the family have much more liberty than those of a higher rank. They have small feet as usual, but they are not so confined to the house, or prevented from looking on and speaking to strangers, as the higher classes are. If a stranger enters the court of the house unexpectedly, he will see a number of ladies, both old and young, sitting in the verandah, all industriously employed on some work—some spinning, some sewing or embroidering, and one probably engaged in culinary operations; and if the stranger be an unknown foreigner, the whole will rise hurriedly, and disappear like a covey of partridges, overturning wheels, stools, and anything else that may be in their way. This was a frequent scene in my earlier visits, but it gradually wore off when it was found I was a civilised being like themselves. These same ladies afterwards would often ask me to sit down, and even set a chair for me, and bring me a cup of tea with their own fair hands; and while I drank my tea, they would go on with their work, laughing and chatting as

freely as if I had been a thousand miles away. But many of these Chinese ladies with all their coyness are regular termagants, as the following curious anecdote will show.

Happening one day at this time to be in a bamboo forest, I came upon two men engaged in cutting down some fine bamboo-trees. Just as I came up with them, a farmer's wife made her appearance from an opposite quarter, and was apparently in a state of great excitement. The men, it appeared, had bought a certain number of the trees, which at the time of sale had been duly marked. But in cutting, instead of taking those they had bargained for, they had just cut down a very fine one which was not for sale. The old lady was so excited that she either did not see me, or her anger made her disregard the presence of a stranger. She commenced first in low short sentences to lament the loss of the bamboo, then louder and louder sentence after sentence rolled from her tongue, in which she abused without mercy the unfortunate men for their conduct. At last she seemed to have worked herself up to a frantic state of excitement; she threw off her head-dress, tore her hair, and screamed so loud that she might have been heard for more than a mile. Her passion reached the climax at last, and human nature could stand it no longer. With an unearthly yell and a sort of hysteric gulp she tumbled backward on the ground, threw her little feet in the air, gave two or three kicks, and all

was still. Up to this point I had been rather amused than otherwise, but, as she lay perfectly still and foamed at the mouth, I became alarmed. The poor men had been standing all this time, hanging their heads, and looking as sheepish as possible. I now looked round to see what effect this state of things had on them. They both shrugged their shoulders, laughed, and went on with their work. About a quarter of an hour afterwards I came back to the spot to see how matters stood—she was still lying on the ground, but apparently recovering. I raised her, and begged her to sit up, which she did with a melancholy shake of the head; but she either could not or would not speak. In a little while afterwards I saw her rise up and walk slowly and quietly home.

Such scenes as that which I have just noticed are very common in the country. A short time after this took place I was passing a peasant's cottage, when I heard another woman just commencing—when one's ear gets accustomed, he can always tell the commencement, middle, or near the end. I stood with several persons outside the cottage listening to this one, and soon ascertained that her husband had been unfaithful to her—a circumstance which she had just found out. It was the same scene over again; she got gradually more and more excited, and then fell back senseless on the ground, and threw her feet in the air. I now ventured round to the door, which was

standing wide open. Her eldest child, a boy about ten years of age, was trying to raise her from the floor; his sister, some two years younger, was crying as if her little heart would break; while an infant was playing with its toy on the floor quite unconscious of the sin and misery going on around it.

These Chinese termagants work themselves up into such passions sometimes for very slight things, and their imprecations or curses are quite fearful. One night an old woman in Ningpo had a couple of fowls stolen. Next morning, when she discovered her loss, she came outside her door, and began in the following strain :—"I have lost two fowls; some one has stolen my two fowls. May he never thrive who has stolen my fowls!" —and then a dead dog caught her eye as it was floating down the river—"May he die like that dog! May his body never be buried! May his children never visit his tomb!" and so on. I forget if this old lady went quite off; many of them stop short and get pacified before they reach the climax.

In the month of August I had a somewhat sudden and violent attack of fever. Whether this was the result of exposure to the sun, or from causes over which I had no control, it is impossible for me to say. Unfortunately I had no medicine with me at the time, and as I was far from foreign medical advice I was glad to put myself into the hands of a Chinese practitioner. I con-

fess I did so with considerable reluctance; but "a drowning man will catch at a straw." There were several medical men in the little tea-village of Tein-tung-ka, within two miles of the temple. My good friend the priest, with whom I was staying, offered his services to go and fetch one of the best of these, an offer which was gratefully accepted. When the doctor arrived I was in bed with a burning fever upon me. After putting several questions as to the time the fever came on, whether I had daily attacks, and the time each attack continued, he then felt my skin and pulse, and looked as if he understood the nature of the disease, and could cure me. "I understand from the priests and your servants you are in the habit of bathing every morning in the cold stream which flows past the temple; this must be discontinued. You are also in the habit of having considerable quantities of Ke-me* put in your soup; this you must give up for the present, and you will live on conge for a few days." I told him his directions should be attended to. He then despatched a messenger to his house for certain medicines, and at the same time ordered a basin of strong hot tea to be brought into the room. When this was set before him he bent his two forefingers and dipped his knuckles into the hot tea. The said knuckles were now used like a pair of pincers on my skin, under the ribs, round the back, and on several other parts of the body. Every now and then the ope-

* A kind of vermicelli, very good about Ningpo.

ration of wetting them with the hot tea was repeated. He pinched and drew my skin so hard that I could scarcely refrain from crying out with pain; and when the operation was completed to his satisfaction, he had left marks which I did not get rid of for several weeks after.

When the messenger arrived with the medicine, the first thing I was asked to swallow was a large paper of small pills, containing, I suppose, about a hundred, or perhaps more. "Am I to take the whole of these?" I asked, in amazement. "Yes; and here is a cup of hot tea to wash them down." I hesitated; then tasted one, which had a hot, peppery kind of flavour, and, making up my mind, gulped the whole. In the mean time a teapot had been procured capable of holding about three large breakfast-cups of tea. Into this pot were put six different vegetable productions — about half an ounce of each. These consisted of dried orange or citron peel, pomegranate, charred fruit of Gardenia radicans, the bark and wood of Rosa Banksiana, and two other things unknown to me. The teapot was then filled to the brim with boiling water, and allowed to stand for a few minutes, when the decoction was ready for the patient. I was now desired to drink it cup after cup as fast as possible, and then cover myself over with all the blankets which could be laid hold of. The directions of my physician were obeyed to the letter, but nevertheless I lay for an hour longer ere perspiration broke, when of course I got

instant relief. Before taking his leave the doctor informed me he would repeat his visit on the third day following about ten in the morning, this being about an hour before the fever was likely to return. He told me not to be at all afraid, and gave me the welcome news that the next attack, if indeed I had any more, would be slight, and that then I would get rid of it altogether.

True to his promise, the old man was with me on the third day, about ten o'clock in the morning. "Has the fever come on?" "No," I replied; "it is scarcely the time yet. I suppose I shall have it in another hour." He now desired me to lie down in bed, and the pinching process was repeated in the same way as it had been done before, but if anything it was more painful. I had then to swallow another large dose of pills, and lastly the hot decoction from the teapot. Ere I had drunk the last cupful my skin became moist, and I was soon covered with profuse perspiration. The fever had left me, and I was cured. I was probably the first *Hong-mou-jin* the doctor had treated, and he was evidently much pleased with the results of his treatment.

Medical men at home will probably smile as they read these statements, but there was no mistaking the results. Indeed, from an intimate knowledge of the Chinese, I am inclined to think more highly of their skill than people generally give them credit for. I remember well, when I came first to China in 1843, a celebrated prac-

titioner in Hongkong, now no more, gravely informed me the Chinese doctors gathered all sorts of herbs indiscriminately, and used them *en masse*, upon the principle that if one thing did not answer the purpose another would. Nothing can be further from the truth. That they are not surgeons I am fully prepared to admit; that they are ignorant of many of our most valued vegetable and mineral medicines is also true; but, being a very ancient nation and comparatively civilised for many ages, many discoveries have been made and carefully handed down from father to son which are not to be despised, and which one ought not to laugh at without understanding. Dr. Kirk, of Shanghae, whose opinion is entitled to the highest respect, informed me he had discovered a most valuable tonic in common use [probably a species of gentian], equal, if not superior, to any of the kind in our pharmacopœias, and there are, no doubt, many other things of equal value unknown to Europeans and well worth investigation.

During my sojourn in this place I had an opportunity of witnessing a novel mode of taking honey from beehives. The Chinese hive is a very rude affair, and a very different looking thing from that we are accustomed to use in England, and yet I suspect, were the bees consulted in the matter, they would prefer the Chinese one to ours. It consists of a rough box, sometimes square and sometimes cylindrical, with

a moveable top and bottom. When the bees are put into a hive of this description, it is rarely placed on or near the ground, as with us, but is raised eight or ten feet, and generally fixed under the projecting roof of a house or outbuilding. No doubt the Chinese have remarked the partiality which the insects have for places of this kind when they choose quarters for themselves, and have taken a lesson from this circumstance. My landlord, who had a number of hives, having determined one day to take some honey from two of them, a half-witted priest who was famous for his prowess in such matters was sent for to perform the operation. This man, in addition to his priestly duties, had the charge of the buffaloes which were kept on the farm attached to the temple. He came round in high glee, evidently considering his qualifications of no ordinary kind for the operation he was about to perform. Curious to witness his method of proceeding with the business, I left some work with which I was busy, and followed him and the other priests and servants of the establishment to the place where the hives were fixed. The form of the hives, in this instance, was cylindrical; each was about three feet in height and rather wider at the bottom than the top. When we reached the spot where the hives were placed, our operator jumped upon a table placed there for the purpose, and gently lifted down one of the hives and placed it on its side on the table. He then took the moveable

top off, and the honeycomb, with which the hive was quite full, was exposed to our view. In the meantime an old priest having brought a large basin, and everything being ready, our friend commenced to cut out the honeycomb with a knife made apparently for the purpose, and having the handle almost at right angles with the blade. Having taken out about one-third of the contents of the hive, the top was put on again, and the hive elevated to its former position. The same operation was repeated with the second hive, and in a manner quite as satisfactory.

But it may be asked, "Where were the bees all this time?"—and this is the most curious part of my story. They had not been killed by the fumes of brimstone, for it is contrary to the doctrines of the Buddhist creed to take away animal life—nor had they been stupified with a fungus, which is sometimes done at home; but they were flying about above our heads in great numbers, and yet, although we were not protected in the slightest degree, not one of us was stung; and this was the more remarkable as the bodies of the operator and servants were completely naked from the middle upwards.

The charm was a simple one; it lay in a few dry stems and leaves of a species of Artemisia which grows wild on these hills, and which is largely used to drive that pest the mosquito out of the dwellings of the people. This plant is cut early in summer, sun-dried, then twisted into

bands, and it is ready for use. At the commencement of the operation which I am describing, one end of the substance was ignited and kept burning slowly as the work went on. The poor bees did not seem to know what to make of it. They were perfectly good-tempered and kept hovering about our heads, but apparently quite incapable of doing us the slightest injury. When the hives were properly fixed in their places the charm was put out, and my host and his servants carried off the honey in triumph. "Come," said he to the operator and us who were lookers on, "come and drink wine." "Ay," said the half-witted priest, "drink wine, drink wine." So we all adjourned to the refectory, where wine in small cups was set before us.

In a former work on China—'A Journey to the Tea Countries'—I noticed a curious substance called "mosquito tobacco," or "mosquito physic," for it is known by both of these names, which I had met with for the first time when travelling in the western parts of the province of Chekiang on my way to the Bohea mountains and the great black-tea country of Woo-e-shan. The day before the discovery was made had been very hot, and during the night such swarms of mosquitoes came that neither my servant nor myself had been allowed to close our eyes. I had no curtains with me, and looked forward with dread to many such sleepless nights during the journey. "Why don't you procure some mun-jung-ean?" said the boat-

men to my servant. Delighted to find there was some simple remedy, I sent on shore to the first village we passed, and procured some sticks of this invaluable substance. I found it answer the purpose admirably, and used it every night during the remainder of that journey wherever I happened to sleep, whether in boats, in temples, or in the common inns of the country.

When I reached England the account which I gave of this substance attracted a good deal of notice from entomologists and others, and I was frequently asked if I had brought any of it home, or if I knew what the ingredients were of which it was composed. I was obliged to plead negligence in not having done the former and ignorance as regards the latter. However much the substance delighted me at first, its constant use, its cheapness, and being an article extremely common, led me, I suppose, to neglect it, as we often do common things. This is the only explanation I can give for my neglect, which, when I came to consider the matter at home, surprised me probably more than those who had made inquiries regarding it. My ignorance of the ingredients which composed it will not excite so much surprise in the minds of those acquainted with the character of the Chinese.

Having occasion to visit the island of Chusan in the end of August, in order to make some arrangements about grafted Yang-mae trees, I found a quantity of this mosquito tobacco in a joss-stick

maker's shop in the city of Ting-hae. On taking it home with me to the house in which I was located, I lost no time in trying its effect upon the mosquitoes, which were numerous at this hot season of the year. On its being lighted the fumes rose slowly upwards, and the air was soon filled with odours which were not at all disagreeable, not more so than the joss-stick or incense which is burned in every Chinaman's house who can afford the luxury, and in all the temples. It appeared, however, to be no luxury to the mosquito, for, in two or three minutes after it was ignited, not a buzz was heard nor a mosquito to be seen.

My next object was to endeavour to find out the ingredients which were used in the manufacture of this curious substance. For this purpose I paid another visit to the shop in which I had bought it. In one part of the premises the people were employed in beating up the various articles used in the manufacture of incense, and in another part others were busy making the joss-stick. The head of the establishment paid his respects to me very politely, and asked me whether I had found the mosquito tobacco answer the purpose. I replied that nothing could have done better, and then commenced to ask him some questions regarding the ingredients used, their proportions, and the mode of manufacture. At first he was very communicative. He informed me the following articles were used:

namely, the sawings of juniper or pine trees (pĭh heang fun, or sung shoo), artemisia-leaves reduced to powder (nai-hai), tobacco-leaves (ean fun), a small portion of arsenic (pe-za), and a mineral called *nu wang*.

With regard to the proportions of each, it appeared that, to thirty pounds of the pine or juniper sawings, about twenty of artemisia, five of tobacco, and a small quantity of arsenic were added. But ere we had come to this point my informant's jealousy had been aroused, and his statements were evidently not much to be depended upon. He now began to question me in return for the answers he had given—"What did I want this information for? if I wanted to buy the article, he had it for sale, and it was cheap enough." To make matters worse, he then coolly told me he was not quite certain that the information he had given me was correct, as he did not understand the process himself, but engaged men to make it for him, which individuals came from the interior.

Nothing further could be gained from my jealous acquaintance at this time, but I was determined not to let the matter rest here, but rather endeavour to gain the end I had in view by other means. At this time I had a very sharp and intelligent artist—a native of Chusan—employed in making drawings of coniferous trees for Miss Boulton, of Hasely Court, Oxfordshire. He had been travelling with me all over the country, and had now come over to Chusan in order to make

some drawings on the island, and also to pay a visit to his father, who combined the professions of artist and doctor in his own person. Both father and son were now set to work in order to get the information required. They were told not to hurry themselves or appear very anxious about it, but to take care as to the correctness of anything they might learn on the subject. In two months I received the result of their investigations, which coincided very closely with my own. Pine and juniper sawings, wormwood-leaves, and tobacco-leaves, reduced to powder, a small portion of nu-wang and arsenic. Each article was well beaten up with water, then the whole mixed together, and in the form of a thick paste rolled on a slip of bamboo. On exposure to the air the substance dried quickly, and was then put away for sale. When finished the sticks are somewhat like the common joss-stick of the country, or about the thickness and length of a light walking-cane.

Another substance, much cheaper than the last, is found in every town and village in the central and eastern provinces of the empire where I have been, and no doubt it is in use over the greater part of China. Long, narrow bags of paper—say half an inch in diameter and two feet long—are filled with the following substances, namely, the sawings of pine or juniper, mixed with a small portion of nu-wang and arsenic. The proportions are thirty pounds of sawings, two ounces of nu-wang, and one ounce of arsenic. This mixture is not

made up in the form of a paste like the latter, but simply well mixed, and then run into the bags in a dry state. Each bag being filled is closed at the mouth, and then coiled up like a rope and fastened in this position with a bit of thread. Many hundreds of these coils, neatly done up and placed one above another, may be seen exposed for sale in the shops during the hot season, when mosquitoes are numerous. When about to be used, the thread which keeps the coil together is cut, then the coil is slightly loosened, so that its sides do not touch each other, for if this happened it would ignite at various parts and soon be consumed. The outer end is then lighted, and the whole is laid carefully down upon a bit of board, when it goes on burning for the greater part of the night. One hundred of these little coils may be bought for a sum equivalent to threepence of our money, and two of them will suffice for a night in an ordinary-sized room.

A third substance, cheaper than either of the above, is made of a species of artemisia or wormwood (*A. indica*) which grows wild on every hill in this part of China. It is the same kind I have already noticed as forming one of the ingredients in the genuine mosquito tobacco, and is that which was used in taking the honey from the bees in the temple of Tein-tung. It is gathered and thoroughly dried, then twisted or plaited into ropes, in which condition it is fit for use. Although cheaper, and consequently more in use amongst the poorer classes, than the other kinds, it is not so efficient,

and it gives out more smoke than is agreeable to a European.

I may be questioned whether the small quantity of arsenic used in making the mosquito tobacco is entirely harmless. I am not sufficiently acquainted with the chemical action which goes on during combustion to answer this in the negative. But it must be borne in mind that the quantity of this poisonous mineral is exceedingly small; and the fact that mosquito tobacco is used by probably one hundred millions of human beings would seem to prove that it could not have any bad effect upon their health.

CHAPTER VII.

Difficulty in procuring black-tea manufacturers — Return to Shanghae — City taken by a band of rebels — Chief magistrate murdered — Strange prejudices of foreign residents — Their professions of neutrality — Chinese warfare — Dr. Lockhart's hospital and patients — Value of medical missions — Public opinion changes — Shanghae evacuated by the rebels — Entered by the Imperialists — Cruelty of soldiers — Effects of the rebellion on the face of the country.

THE arrangements I had been making during the summer months with farmers and tea-cultivators for supplies of plants and seeds in the autumn, were brought to a successful termination in the end of August. But as tea-seed does not ripen in China until October or November, I had two months before me to attend to another and equally important part of my duties. This was to procure and forward to India some first-rate black-tea manufacturers—a task which I found much more difficult than that of selecting and exporting seeds and plants. The Chinese are supposed to be an erratic race, and are found almost populating such places as the straits of Malacca, Java, and Manilla. Of late years shiploads of coolies have been sent to the West Indies, while thousands have emigrated to the gold-fields of California and Australia. But nearly all these are natives of the province of Canton, and the southern part of Fokien, and

moreover are men who have either been brought up in seaport towns, or only a short distance inland. Had such men suited my purpose, I could easily have procured them in any number. But unfortunately the best black-tea districts of China are far inland; the natives of such districts are simple countrymen who have never seen the sea in the course of their lives, and who have a very indistinct idea of countries which lie beyond it. And besides, such men as I wanted were able to earn good wages at home, and consequently less inclined to push their fortunes abroad. Although it would, therefore, have been the simplest thing possible to procure *Chinamen*, it was a very different matter to get hold of good tea-manufacturers.

There were two ways of accomplishing the object in view, either by going to the homes of such men myself, or by getting them through respectable Chinese at one of the northern ports. The first of these methods was not very likely to succeed; it is not probable that a stranger and a foreigner could induce such men to leave their homes, however liberal the offers he might make them might be. They could, or at least they would, have had no confidence in the fulfilment of such promises. I had, therefore, adopted the second mode of gaining the desired end, and now determined to return to Shanghae for a few days in order to see what progress had been made in the matter by the Chinese who had promised me their assistance.

On returning to Shanghae I found no progress whatever had been made, and indeed men's minds were so full of the rebellion raging in the country at the time that little else could have been expected. In the end of August and beginning of September rumours were current that the Fokien and Canton men, who are rather numerous at this port, were about to rise and hoist the standard of the new Emperor, T'hae-ping-wang, in this ancient city. The authorities, who had long felt their weakness, issued proclamations denouncing a man named Le, who, with some forty others, was taken up and detained for some hours at the office of the magistrate. The official, however, did not dare to punish these persons: indeed, he was coolly informed that if he did so his own head would pay the penalty. This threat had the desired effect: Le and his companions were set at liberty, and it is needless to say grew bolder and more unruly than ever they had been before. As a further step to preserve the peace of the city, a body of lawless men belonging to a secret society, who could not be controlled, were taken into the pay of the Government. This was a last resource, and placed the Government upon a mine which could be sprung at any moment for its destruction.

The morning of the 7th of September, being the day on which the mandarins usually pay their visit to sacrifice in the temple of Confucius, was chosen by the rebels for the attack upon the city. Without knowing anything about their plans, I hap-

pened to pay a visit to the city soon after daybreak. On entering at the north gate I observed a number of men looking earnestly at some object in the guard-house, and saw at a glance that something of an unusual nature had taken place. Ascending the steps of the guard-room with the Chinese, I was horrorstruck at finding the mats and pillows belonging to the guard saturated with human blood. Upon inquiry, I found that a band of men, believed to be composed chiefly of the members of the secret society already noticed, and called the "Small Sword Society," had entered the city and were then on their way to the houses of the chief mandarins, namely, the Taoutae and Che-heen. They had met with some feeble resistance from the guard, whom they soon overpowered and made themselves masters of the gate.

When the rebels reached the centre of the city, they divided themselves into two divisions,—one of which marched to the Che-heen's office, and the other to the Taoutae's. The guard at the Che-heen's, consisting of about forty men, fled without making the slightest resistance, and are supposed to have been in league with the rebels. Some one ran to inform the magistrate that his house was attacked, and the old man came out and endeavoured to pacify the rebel mob with a few fair words and promises for the future. He was told, however, that such promises were now too late, upbraided for his former conduct, and barbarously murdered on the spot.

The division which marched to the Taoutae's was equally successful, and met with no resistance. Report says this officer—who was the highest in Shanghae—behaved very bravely on this trying occasion. Having been informed of the intended attack a minute or two before it took place, he dressed himself in his official robes and came out to meet the rebels. Most of his attendants had fled, and, seeing that the few men who remained true were a very unequal match for the rebels, he prevented them from offering any resistance. "If you want my life," said he, "you have the power to take it,—see, I am unarmed and defenceless." The rebel chief replied that they did not want his life, but that he must forthwith hand over the official seals, and take an oath not to molest those who were now the masters of the city. He immediately gave up the seals, and retired to his own apartment, where he was allowed to remain unmolested while the other parts of the buildings were plundered and gutted.

In the afternoon I paid another visit to the city with the Rev. Mr. Edkins, of the London Missionary Society. On arriving at the north gate we found a strong guard stationed there, who, after some little persuasion, allowed us to pass in. From the appearances which presented themselves at every turning, it was evident the rebels had made a good use of their time. Not only were all the gates strongly guarded, but patrols of two men each were marching through the city in all

directions and preserving order. These guards had strict orders to preserve the property of the inhabitants from thieves of all kinds, and to punish in a summary manner all who might be caught stealing. Two men who were taken in the act were immediately put to death without judge or jury or trial of any kind. The order which prevailed in all quarters, considering the lawless bands who were in possession of the city, was very remarkable.

Threading our way through the narrow streets, in the direction of the public offices, which had been the scene of such disturbances in the morning, we were everywhere treated with marked respect both by the inhabitants and by the various patrols. When we reached the house of the Cheheen a strange scene was presented to our view. Hundreds of people were busily engaged in ransacking the premises and carrying off everything which could be taken away. The furniture of the various rooms and all moveable articles had gone first, and the crowd were now busily employed in taking down the windows, doors, all kinds of framework, wooden pillars, and indeed everything which could be converted into use. This crowd was not what in England we would call a mob, but a set of respectable, orderly plunderers,—or perhaps *luters* would be a better word,—whose proceedings were sanctioned by the victorious rebels now in possession of the city. However particular the latter seemed with reference to the

preservation of private property, that of the mandarins and Government seemed to be given over to the people for plunder as a matter of course. When we reached the upper end of the collection of buildings which formed the official residence of the Che-heen, we observed a crowd of people, who seemed to be lookers-on like ourselves, moving to some apartments on one side of the central hall. Following in their steps, we came to a court, or small Chinese garden, containing a few ornamental plants in pots and a pretty arbour covered with the *Glycine sinensis*. In a small room, now in ruins, at the upper end of the court, a crowd of people were observed gazing intently at some object on the floor, and from the expression on every countenance we readily conjectured that this must be the body of the Che-heen, who had been murdered in the morning, and which we were now desirous of seeing. As we approached the spot, the crowd readily made way, when a melancholy and shocking sight was presented to our view. On a mat, in the middle of the room, lay the body of the murdered magistrate, covered with the wounds which had been inflicted by his ruthless countrymen. It was a sickening sight, so we turned away and made our way out through the busy crowd, who were still employed in what appeared to be considered a kind of legal plunder.

Leaving the offices of the magistrate, we now proceeded to the residence of the Taoutae, or

highest civil officer in the city. Here a scene of a different kind, but scarcely less curious, was presented to us. This place had been made the head-quarters of the rebels, and we found the doors strictly guarded by their men. The guards allowed us to pass without question; and, walking up a straight path to the furthest end of the buildings, we found a large hall filled with armed men, engaged in arranging some matters connected with their food and wages. A more blackguard or unruly looking collection of human beings I had never before seen. Some were armed with short swords, others with muskets or pistols, and a number with rusty-looking spears of all forms and sizes. Here and there we observed some busily engagd in grinding their swords, and every now and then feeling their edges like a butcher about to slay an animal for his stall. The greater number were taking part in a hot discussion which was then going on with their leaders, all talking at the same time, and, apparently, in the greatest disorder; but, as this is Chinese custom, it gave us but little surprise or concern. The uniform worn by this motley band was most varied in its character; but each man wore a distinguishing badge of some kind, either round his head, or as a sash round his body, or on his breast. The Fokien bands had generally a red band tied round the head; while the Canton men had a white one, said to be a badge of mourning for the Ming dynasty—their ancient kings.

Having seen quite enough of these unruly spirits, we left their halls, and walked quietly homewards through the streets of the city. Every place was perfectly quiet:—some of the shops were open, and the people generally seemed to be looking on with Chinese indifference.

In the new foreign town measures were taken by the English and American residents for their own protection. On the morning after the occurrences had taken place which I have just been narrating, the pretty Chinese Custom-house, which is so great an ornament to the foreign town, and which had been evacuated by the authorities, was completely gutted by the Chinese, and no one interfered to prevent them. It was attacked by no mob of lawless vagabonds, but by the sober and industrious people in the neighbourhood, who seemed to consider its contents a kind of *lute* to which they were justly entitled. Every one agreed, when too late, that it was a pity to allow such a proceeding within our own boundary,—more particularly when a single consulate official, or a single sailor from one of the men-of-war in port, could have prevented it, without any force being necessary further than to stand at the door and warn the people off.

The description which I have thus attempted to give of the taking of Shanghae by this rebel band will throw some light upon the character of the Chinese,—but it is difficult to give to civilised nations in the West a correct idea of this extra-

ordinary people. Will it be credited that a city containing upwards of 200,000 inhabitants — walled and fortified, and, to a certain extent, prepared for an attack—allowed itself to be taken by a band of marauders scarcely numbering 500 men, badly armed, undisciplined, and bent on plunder? And yet such is the fact, for, however strict the rebels appeared to be in their endeavours to preserve private property, they were robbing the Government and "*squeezing*" some of the more wealthy among the inhabitants. It seemed to be generally acknowledged that they had, as yet, no connexion with the Kwang-si rebels, although they expected to have shortly. It was, no doubt, the intention of many of them to "feather their own nests" pretty well in the first place, and then hand over the conquered city to any one who chose to take it off their hands. In the mean time the poor people suffered,—trade, both foreign and native, was paralyzed,—and one trembled for the fearful calamities which now hung over this unhappy country.

For this state of things in Shanghae the foreign residents have been greatly to blame, inasmuch as they not only did not endeavour to prevent them, but actually encouraged the attack. I do not mean that they ought to have taken to arms and fought on the side of the Imperialists, but the moral force in their hands was very great; and had it been generally known that foreigners were opposed to any attack upon Shanghae, it is more

than probable such an attack would never have been attempted. But a course very different from this was pursued. The sympathies of foreigners generally were all enlisted on the side of the rebels and against the government of the country. It was no secret that we as a body, instead of opposing an attack upon the city, would hail it with pleasure, and wish it success, although we would otherwise remain neutral. Civil and naval officers, missionaries, merchants, and shopkeepers, all—with a few honourable exceptions—were in favour of the debauched band of robbers who took the city of Shanghae on the 7th of September. The unprejudiced observer of these events had now to witness a most extraordinary and anomalous proceeding, namely, that of our men-of-war gallantly putting down the hordes of pirates which were infesting the coast, while the land pirates, such as those who took the city of Shanghae, were encouraged and applauded. And why? Because the latter spent their days and nights in smoking opium, in drunkenness, and in all kinds of debauchery, and gave out they were followers of Tai-ping-wang, or, as he was called, the Christian King!

It would be too sweeping an assertion to place the whole of these men in the same class. Some perhaps were patriots anxious for the good of their country, but I am afraid these characters were comparatively rare. And yet the good ones were probably amongst those who held out to the last,

and who suffered the greatest obloquy when "public opinion" changed.

Public opinion, when by this is understood the intelligence of a people, is generally correct; and it is difficult to account for the errors of the Shanghae community, more particularly when it is considered that it consists of men of education and sound common sense. The supposed Christian character of the Kwang-si rebels had no doubt a tendency to interest and captivate, and perhaps the corrupt nature of the present government of the empire might make many wish for a change. But whatever the main body of the rebels at Nanking might be — and the visits of foreigners to that camp had been too few and brief in duration to enable them to form a correct estimate of their politics and religion — there surely could be no doubt as to the character of those who claimed connexion with them in Shanghae. And add to this, that there was but one opinion regarding them shared by all respectable Chinese in this part of the country—and that was that they were nothing more than thieves and robbers—and one wonders still the more.

For more than a year this band held possession of the ancient city of Shanghae. A large force was sent against them by the government, and encamped at various points round the city-walls, and at a safe distance from the ramparts. The object of the Imperialists appeared to be not so much to drive them out by hard fighting as by

gradually cutting off their supplies to starve them into capitulation. Here again their plans were to a certain extent frustrated by *neutral* foreigners. The foreign settlement, as it is called, occupies a large tract of ground situated on the north-east side of the city just outside the walls, and is bounded on the east by the Shanghae river. Notwithstanding the complaints and remonstrances of the government of the country, many persons were unscrupulous enough to keep supplying the insurgents with arms and ammunition of all kinds in large quantities, for which they were liberally paid with the spoils stolen from the public treasury or wrung from the inhabitants. Some were in the habit of making large sums of money by running cargoes of gunpowder, carrying it into the city, advising and counselling the rebels, and then when danger approached sneaking back to the foreign settlement for the protection which the flags of England or America afforded them. Nor was this conduct effectually checked by either of these governments for a considerable length of time, although they had full power to have done so. And this is what we call being neutral!

The battles or skirmishes which took place every few days betwixt the besiegers and besieged during the time the city was in the hands of the rebels were most amusing performances.

During the time of the siege Dr. Lockhart's Chinese hospital was crowded with patients. Some came to have limbs amputated, others to have balls

extracted, and others again to have their wounds dressed. All were attended to in the kindest manner "without money and without price." It did not signify to the Christian missionary whether the person carried to his door for medical aid was an imperialist or a rebel; it was enough that he was a human being suffering pain and desiring to be relieved. And hence the wounded of both parties met in the same hospital, and each had his wounds attended to by the same friendly hand.

In his report for 1854 Dr. Lockhart relates the following circumstance:—"One Sunday afternoon two wounded persons were brought in; one was a Canton man, an artilleryman at the battery on the eastern side of the river, or Poo-tung; he had fired his gun once, and was reloading it when the charge exploded and so severely injured his arm that it had to be amputated below the elbow, and he did well. The first shot that he fired had crossed the river, and struck a woman near the city-wall on the leg, destroying all the soft part from one side of the limb. These two patients met at the hospital about an hour afterwards." He then tells us:—"A man was brought in one morning whom a rebel had caught, supposing him to be an imperial soldier, and tried to behead (!), but owing to the man's struggles he was unable to effect this, though he inflicted most severe injuries upon him." Then a beggar is brought in who had been struck on the leg by a cannon-ball; his wound is dressed, he is lodged and fed and sent away cured. An

old fisherman was dropping his anchor at the mouth of the river on a windy day, when his hand got entangled in the cable, so that it was almost twisted off. The thumb was found to be much mangled, the back of the hand was almost destroyed, and the metacarpal bones fractured, so that the fingers and palm were all that were left. The result of skilful treatment is that the hand "is now almost well, though the man will not have much motion in his fingers."

Such are the labours of the medical missionaries; skilful, unwearied, and free to all as their native air, or their refreshing streams. The soldier, the sailor, merchant, mechanic, farmer, and labourer, high and low, rich and poor, have the benefits of the hospital freely offered to them. In 1853 no fewer than 11,028 patients had been operated upon, or treated in some way, while in 1854 the number amounted to 12,181.

But the Medical Missionary Society have objects which are even of a higher nature than "healing the sick and curing all manner of diseases." When the patients assemble for medical treatment in the hall of the hospital they have the Gospel preached to them by one of the members of the London Mission. Private religious instruction is also given to patients in the different wards. And thus, while the heart of the cold and unfeeling Chinese is softened and opened up by kindness—which he feels to be disinterested, and which acts like spring showers upon plants—the seeds of the Gospel of

Christ are sown upon it, and, it is hoped, in many, very many instances, they may vegetate and produce their fruits in after years when the patients have returned to their homes.

The charitable labours of the medical missionary are not confined to the hospital within the bounds of the foreign settlement. He has also a dispensary in the midst of the crowded city, which he visits on stated days and attends to outdoor patients, many of whom may not be able to come as far as the hospital. Indeed, wherever his labours are required he is to be found ministering to the wants of the sick, and doing all he can to alleviate pain. The following extract from one of Dr. Lockhart's reports will show that the jails are also visited, and give a good illustration of the cold-blooded cruelty of the Chinese government :—

"In the beginning of the summer, attention was called by some of the natives in the city to the fact that there were a number of men who had been severely wounded in the Che-hëen's (or magistrate's) jail; a visit was immediately paid to the place, when it was ascertained that, in a yard which was one of the departments of the inner prison, about fifty pirates, all Canton and Fokien men, had been confined; but that on the morning of the day when it was visited they had tried to break out of prison and were very riotous, on account of some additional hardship that the officers intended to inflict on them, and also because some of the party were to be separated from

the rest. The soldiers of the garrison had been called out, who fired several rounds of musketry into the yard and the prisoners' cells, till the rioters were rendered quiet, or at least disabled; when the soldiers rushed in and beat them with wooden poles for some time. After this the whole of the prisoners were loaded with extra manacles, and those who had not been severely wounded were forthwith submitted to the bastinado till they could hardly walk.

"The scene presented in the yard, and the cells around it, was one of perhaps common occurrence in Chinese prisons, but, it is to be hoped, not often seen elsewhere. Four men were killed, and lay at the door in a heap, just as they had been thrown down; one man had compound fracture of the thigh; three had compound fracture of the tibia, the result of gun-shot; others had fractures of the leg and arm. On inquiring from these what had caused their injuries, they said they were occasioned by blows from the poles with which they were attacked by the soldiers after the firing had ceased; several had received severe sword-cuts, and others had bullet-wounds in various parts of the body and limbs. About twenty were wounded in the affray; the remainder had the skin of their backs, thighs, and legs beaten off by the bastinado; and the moans and cries that proceeded from all parts of the yard were heartrending. The men that had the compound fractures had not only chains on their hands, and bars of wood chained to their

feet, but also on one knee a band or oval hoop of iron, placed over the knee, while the leg was flexed on the thigh, and to confine this in its place a rod of iron was thrust through the middle of the hoop at the ham and locked, so that it could not be removed; the knee was thus kept forcibly bent, causing much agony to the wretched prisoners.

"It was then late in the afternoon, and almost dark; all that could be done, however, was effected as speedily as possible; bullets cut out, wounds dressed, fractured limbs bound up and put in position, as far as time and circumstances would allow; and the next day, bandages, splints, ointment, and whatever else was wanted, were taken and applied to the sufferers. Attempts were made, by application to the officers, to induce them to take off the hoops and chains from the fractured limbs, but the application was refused; and at a later period, when the request was more urgently pressed, the officers said that they would not do it, and that they hoped the men would all die, and the sooner the better; also that they wished no help or relief to be afforded to them.

"However, the pirates themselves were very thankful for the relief they experienced, and they assisted and nursed one another very kindly. The way in which orders were given, and relief administered, in the cells, was a curious process; one of the occupants was an intelligent young man, and spoke English very well; he had been beaten

on the thighs, and had logs of wood chained to his legs, so that he could not walk; this man was put on the back of another, who had chains only on his hands, and was thus carried about from cell to cell to receive instructions, and give directions as to what was to be done in the intervals of the visits. The bodies of the four dead men remained in an outer cell for more than a week, but a mass of ice was thrown upon them to keep them from putrefaction to some extent, until the affair had been examined into, and reported to the superior officers. One or two more died, and in process of time the rest recovered of their wounds, after rather a large consumption of plasters and bandages. When the city was afterwards taken by the Triads, the young man above alluded to was found to be in command of a detachment of men, and in charge of the Little East gate; and being dressed up in velvet and satin, presented a very different appearance from what he had done when loaded with chains and covered with rags in the prison."

The Chinese as a people are cold and indifferent to religion of any kind: humanly speaking, nothing less than a miracle will convert them to Christianity. Missionaries have been in China for many years; larger numbers have been sent out from England and America since the last war, when the country was partially opened up to foreigners. These men have been labouring there, I believe, in most instances, most conscientiously, and with an ardour and single-mindedness of pur-

pose which is worthy of all praise, and yet what is the result? How few have "believed their report"! The Chinese as a nation are jealous, selfish, and eminently conceited; it is therefore difficult to convince such minds that nations many thousand miles distant will subscribe large sums of money merely for their religious benefit, or that men are to be found who will leave friends and home with no other views than to convert them from heathenism to Christianity. And hence it would seem that the labours of the medical missionary societies would prove a powerful auxiliary in aiding the spread of the Gospel amongst such a people. All nations, even the most cold and selfish, have some kindly feelings in their nature capable of being aroused and acted upon. If anything will warm such feelings in the minds of the Chinese, the labour of the medical missionary is well calculated to do so. The blind receive their sight, the lame are enabled to walk, and the wounded are cured. And when the better feelings of the man are thus expanded into something like gratitude, his prejudices are more likely to give way, and thus his mind may become softened and more apt to receive religious impressions.

Having been led to make these remarks upon the value of medical missions, I will now return to the Shanghae rebellion. For many months the army of the Imperialists seemed to make no impression upon the rebel bands who held the city. Battles, such as has been described, were fought

every few days, the success, such as it was, being sometimes on the one side and sometimes on the other. Mines were dug and sprung, breaches were made in the walls and as quickly repaired, and it seemed as if the siege was likely to last for an indefinite period of time. But public opinion began to waver, and then changed altogether ; it was found out at last that the bands who had taken and held possession of the city were not patriots fighting for their country's good, but merely a set of land-pirates, whose brethren we had been taking means to destroy on the high seas. The commanders of the French ships of war in the port, who had never viewed them with a friendly eye, and who had had some disputes with them on various occasions, now took a decided part against them and in favour of the Imperialists. A breach was made in the city wall and the rebels attacked in their stronghold, which they defended with much skill, and eventually forced the French to retreat after having lost some of the best and bravest of their officers.

But this trifling success was unavailing. The imperial government, having frequently remonstrated with the foreign consuls against their settlement being used as a communication with the city, was at length listened to, and *allowed* to build a high wall in order that this connexion might be cut off. The insurgents thus hemmed in on all sides and likely to be eventually starved, bombarded by the French ships, having to repulse the

attacks of the Imperialists, and deserted by nearly all their friends, at length came to the determination to evacuate.

When the rebels evacuated the city, the *brave* Imperialists entered it and immediately set it on fire in various places. The evening on which this took place was perfectly calm, and the scene must have been one of the grandest and at the same time one of the most painful ever beheld. The fire was first seen running along the ramparts and destroying tent after tent—these having been occupied only a few hours before by the insurgents. Then the city was observed to have been set fire to in several places, and, owing to the construction of the houses (they are built chiefly with pine and bricks), the fire spread with fearful rapidity. The whole city, about three miles in circumference, appeared to be in flames—guilty and innocent were perishing together, thousands were rendered houseless and driven from their homes, and where to go they knew not. In the midst of all this terror and confusion the imperial soldiers were plundering what had been left by the rebels, which I believe was not very much, and hunting down the unfortunate, in order to cut their heads off and claim the promised reward. Some of the latter, as a last resource, hid themselves in coffins, hoping thus to escape their ruthless pursuers. Many of them were discovered and slain, and then the soldiers used this as a pretence for breaking open the coffins of the dead, in order to get the

money or gold and silver ornaments which are often deposited with the bodies after death. Of all that band of marauders who fled from Shanghae that night, but few remained either to fight or to steal. The numerous heads which were afterwards seen on poles, and trees, and walls, the fearful stench which poisoned the air for many weeks during the hot weather which followed, told a sickening tale of crime and blood. The bravery displayed by them on many occasions showed plainly of what stuff the Chinese are made, and what as a nation China may yet become, and made one regret it had not been shown in a better cause.

When I arrived at Shanghae, a few days after the evacuation, I found fully one-third of this ancient city in ruins. The poor inhabitants were wandering about looking out for the spots where their dwellings formerly stood, and in many instances marking their boundaries with a few stones or bricks. Most of them seemed completely heart-broken and paralysed, and were taking no steps to rebuild their former homes. The gardens and nurseries in the city and suburbs have necessarily suffered severely. It was quite melancholy to look into many of them. One just outside the north gate, which furnished me with some of my finest plants when I was collecting for the Horticultural Society of London, was completely destroyed. A fine *Glycine sinensis*, which formerly covered a large trellis, was now half-buried in

ruins, but still putting forth its long racemes of blue flowers half-covered with the broken tiles and bricks, and told in mournful accents its tale of peaceful times. A noble tree of the carnation-flowered peach, which in former years used to be loaded with rose, white, and striped blossoms, and admired by all who saw it, had been cut down for firewood, and the stump alone remained to tell where it grew. Hundreds of pot-plants were huddled together, broken, and destroyed. The little house where the gardeners used to live was levelled with the ground; and the old lady, the proprietor whom I had known for some years, and who managed the concern after her husband's death, was gone—no one knew where. In the city many places were in the same condition. A great portion of the celebrated tea-gardens was destroyed. Here there was one little garden situated in front of a gentleman's house and surrounded with high walls. In addition to numerous plants in pots, it contained two pretty specimens of *Sophora japonica pendula*, grafted high, as we see the weeping-ash in England, and presenting an appearance not unlike it in the distance. The house and high walls were in ruins, and the trees, which had somehow escaped, could now be seen a long way off, budding and becoming green amidst this scene of desolation. The face of the country for some miles from the city walls was also entirely changed. Formerly it had a rich appearance, and was studded all over with clumps

of trees. All had been cut down for firewood for the imperial army. Clumps of *Cryptomeria japonica*, *Juniperus sphærica*, and bamboos had entirely disappeared. The celebrated peach-gardens near the south and west gates of the city, which at this time of year (April) used to be one sheet of bloom, had now nothing remaining except the stumps of the trees. What I regretted as much as anything was some noble specimens of *Salisburia adiantifolia*—the "Ging-ko" of the Japanese. This is apparently indigenous to this part of China, and attains to a very large size; indeed, it is by far the largest tree in the district. Its fruit, which at first sight has somewhat the appearance of the almond, is much esteemed by the Chinese, and consequently abundant in the markets.

Such are some of the effects of rebellion in a half-civilised country like China. The picture which I have endeavoured to paint applies, unfortunately, to many other parts of the country besides Shanghae. Hundreds of towns and villages were in the same state; their inhabitants had been driven from their homes by fire and sword, the innocent in many instances perished with the guilty, and even women and children were not spared. One party was just as bad as the other, and the "tender mercies" of both "were cruel." Amongst foreigners residing in this country enthusiasm had generally given way to common sense, and they had now no hopes of the Christian

character of the Canton or Shanghae rebellion; indeed there has ever been strong proof that thieves or pirates would be a much more appropriate name to apply to the rebels in these towns than the sacred one of Christian. Let us hope for better things as regards the Nanking insurgents and their leader Tai-ping-wang, when we know them as intimately as we have known their countryman at Shanghae and Canton.

Although the picture which I have given of some parts of China is a melancholy one, it must not be supposed to represent the general condition of the empire. China is a large country, and those parts disturbed by rebellion bear but a small proportion to the remainder, which is perfectly undisturbed. Indeed, even a mile or two away from a place in the hands of the rebels we find the country quiet and the husbandman engaged in cultivating his land. Thus it is that notwithstanding all these disturbances we have no lack of tea, silk, and the other articles which form the bulk of our exports.

CHAPTER VIII.

Return to the tea-districts of Chekiang — Mode of making collections of seeds amongst Chinese peasantry — Messengers sent to Moo-yuen and Ping-shuy — Ping-shuy teas — Agricultural and Horticultural Society of India — Varnish-tree — Wax-insect tree — Soap-tree — Death and funeral of a Buddhist priest — New blue dye — Its cultivation and manufacture — "Green indigo" — Its introduction to India and Europe.

THE events recorded in the last chapter spread themselves over more than a year of time, namely, from the autumn of 1853 to the spring of 1855, and their relation, in order to present them in a connected form, has carried me somewhat in advance of my narrative. It is now necessary to go back to the beginning of October, 1853. Having finished my work in Shanghae, I took my departure for the tea-districts in Chekiang in order to make collections of seeds and plants for the government plantations in the Himalaya.

When I arrived amongst the tea-hills in that province, I found the seeds of the tea-plant just ripe, and all my old friends busily employed in collecting them in anticipation of my arrival. In my earlier experience with the Chinese things were much more difficult than they were now. Then the country-people used to fly from me whenever I appeared amongst them, and I was

often obliged to gather the seeds myself, and with my own people. Now we were better acquainted, and my only difficulty was to prevent them from bringing me too many.

Having established myself in my old quarters in the temple of Tein-tung, I went to work in Chinese style. It was given out by my people and the priests that I had arrived for the purpose of making purchases of tea-seeds, that I wanted five or six hundred catty, and would continue to purchase all that were brought to me, providing they were of good quality, until that quantity was made up. On the day following this announcement, and for many days afterwards, the people began to flock to the temple in great numbers, for the purpose of selling their tea-seeds. The venders were chiefly old men, women, and children—a class who could do light work, such as gathering tea-seeds, although not heavy field-labour. My time was fully occupied from daylight until dark in examining, settling the price according to quality, and weighing the seeds. In this labour I was greatly assisted by my good friend the priest to whom I have already alluded, and who, having a small tea-plantation himself, was an excellent judge of the seed. Many were the little disputes we had as to quality and price, which were always carried on with the most perfect good-humour, and generally referred to the priest for arbitration. He was much respected by the natives themselves, and his word was considered as satisfactory and final. It was a pleasing

sight to observe those happy smiles on their countenances when they had sold their little stock and put the strings of cash into their baskets. In a few days I had completed the quantity which I intended to export from this part of the country.

While making collections in this district I had despatched two of my own people on whom I could depend to the districts of Moo-yuen and Ping-shuy, in order to bring me seeds from those places. Moo-yuen is in the Hwuy-chow country, and is well known for producing the finest green teas exported to Europe and America. Ping-shuy is in the province of Chekiang, not very far from the old city of Shao-shing-foo, which will be found noticed in my 'Journey to the Tea Countries.' The Ping-shuy district is becoming a place of considerable importance—the teas are beautifully made there; and as it is much nearer to Shanghae than Hwuy-chow, the land-carriage is considerably less in amount. Indeed, the whole of these Chekiang tea-districts have received great advantages from the opening of Shanghae to foreign trade; their teas have advanced in price, and large quantities of them are made up annually to suit the foreign taste, and sent to that port for sale.

Both my messengers returned in due time, and had most fully accomplished the objects for which they were sent. But our collections did not consist of tea-seeds only. Large quantities of the chesnuts I have alluded to in Chapter III. were procured at this time in the vicinity of Tse-kee;

seeds of the hemp-palm, valuable on account of the fibre which it yields, and *Cryptomeria japonica*,

Rain Cloak. Hemp Palm.

a fine timber-tree, were obtained in large quantities on the hills near Tein-tung; and one of my messengers succeeded in bringing me a good supply of the seeds of the funereal cypress from Hwuy-chow. All these and many other useful and ornamental trees and shrubs are now flourishing on the slopes of the Himalaya, in the north-west provinces of India.

Shortly after my arrival in China the council of the Agricultural and Horticultural Society of India applied to the government of Bengal for any assistance I could render them in the way of sending the society seeds and plants of useful and

ornamental trees and shrubs which were likely to be of value in India. The request of the society was immediately complied with, and I was directed to afford any assistance which might be in my power. My attention was directed by the society to the Chinese varnish-tree,* the wax-insect tree,† the soap-bean tree,‡ the various trees valuable for their fruit or timber, and ornamental plants; but above all to the green-indigo (so called),§ which yielded a dye which was at that time attracting much attention in France.

The tree which yields the Chinese varnish is a species of Rhus, which, although producing an article of great value, is extremely dangerous. The varnish is largely used in the country for giving a fine polish to tables and chairs used in the houses of the wealthy. The beautiful lacquer-ware so extensively exported from Canton to foreign countries, and which is so well known and justly admired, is produced by this tree. It has the valuable property of being less liable than French-polish to be injured by a heated vessel which may be placed upon it; but it is very poisonous, and requires to be handled with great care by the workmen who use it. Indeed, after furniture is dry, it is very unsafe for certain constitutions until it has been in use for some time, and the smell entirely gone. A friend of mine, Mr. Jones, American consul at

* Rhus sp. † Fraxinus sp. ‡ Cæsalpinia sp.
§ Rhamnus sp.

Foo-chow-foo, used some furniture which had been lacquered some time and was apparently quite dry, and yet was very ill for a long time from its effects; so ill that he thought he should be obliged to leave the country and go home. And this is no solitary instance, for I have known several persons suffer most severely from the same cause.

The wax-insect tree is no doubt a species of ash (fraxinus). It grows abundantly on the banks of

Wax Tree.

ponds and canals in the province of Chekiang; and a small quantity of wax is also produced in this

province. I was indebted to Dr. McCartee, of Ningpo, for some beautiful specimens of the fresh insect upon the branches of this tree. This insect has been named *coccus pela* by Mr. Westwood. When fully developed on the trees it has a most remarkable appearance; they seem as if covered with flakes of snow. The wax is an article of great value in Chinese commerce, and a small portion is exported.

The fleshy pods of the *cæsalpinia* are largely used as soap in all parts of China, and may be bought in every market-town.

All these trees and many others have been introduced to India through the Agricultural and Horticultural Society, and some of them distributed largely amongst its members. The green-indigo (so called) has also been discovered and introduced both to England and to India.

During my sojourn in the old temple of Tein-tung, which I have already said was my head-quarters whilst at work amongst these hills, I witnessed some ceremonies connected with the death and funeral of a Buddhist priest who lived next door to where I was located, which appeared so curious and full of interest at the time that I was induced to give a description of it in my journal.

There are two orders of the priesthood in a large Buddhist monastery. The first and most numerous is that whose members assemble daily in the largest hall or temple, and perform a sort of cathedral service, which I have given a description of in my

'Journey to the Tea Countries.' In a retired spot amongst some lofty trees on the hill-side near Tein-tung the traveller may see an unmeaning-looking brick building some ten feet high and hollow inside. The dome of this building is blacked with smoke, as if it was not unusual to light fires inside. On inquiry he will find that in this place the bodies of the priests just mentioned are burned after death. A little further on, on the same hill-side, there is a neat-looking temple, not different in external appearance from the numerous structures of this description seen all over these hills, but on going inside several closed white-washed urns are met with, and these contain the ashes of the priests. I never had an opportunity of witnessing the ceremony of burning these bodies; but my old friend the priest with whom I was staying confessed that the sight was anything but pleasing.

The second order of the priesthood—my landlord was one of them—occupy neat little houses adjoining the large halls, where they generally seem to lead a lazy kind of life, and have only the private devotions of their little temple to attend to; that is, they are not required to attend the service in the large hall. Their bodies are not burned after death like the former, but are conveyed to the most lovely spots on the sides of the hills—spots on their own little farms which they had selected for themselves during their lifetime. One of this order died during this autumn when I was

located in the monastery, and the ceremonies connected with his wake and funeral I shall now endeavour to describe :—

A young priest—a mere boy—came running breathless one morning into the house where I was staying, and called out to my host, "Come with me, make haste, for Tang-a is dying." We hastened to the adjoining house, which was the abode of the sick man, but found that the king of terrors had been before us, and the priest was dead. By this time about a dozen persons were collected, who were all gazing intently on the countenance of the dead man. After allowing a few minutes to elapse, orders were given to have the body washed and dressed, and removed from the bed to a small room with an open front, which was situated on the opposite side of the little court. Mosquito curtains were then hung round the bed on which the body was placed, a lamp and some candles were lighted, as well as some sticks of incense, and these were kept burning day and night. For three days the body lay in state, during which time, at stated intervals, four or five priests decked in yellow robes chanted their peculiar service. On the third day I was told that the coffin was ready, and, on expressing a wish to see it, was led into an adjoining temple. "Are there two priests dead?" said I, on observing another coffin in the same place. "No," said one, "but that second coffin belongs to the priest who lived with deceased, and it will remain here until it is needed."

On the evening of this day, when I returned from my labours amongst the hills, I called in again to see what was going on, and now a very different scene presented itself. And here I must endeavour to describe the form of the premises in order that this scene may be better understood. The little house or temple consisted of a centre and two wings, the wings being built at right angles with the centre and forming with it three sides of a square: a high wall connected the two wings, and so a little court or Chinese garden was formed, very small in extent. A square table was placed inside the central hall or temple, one in front of it, and one in front of each of the two wings. Each of these tables was covered with good things—such as rice, vegetables, fruits, cakes, and other delicacies, all the produce of the vegetable kingdom, and intended as a feast for Buddha, whom these people worship. This offering differed from others which I had often seen in the public streets and in private houses, in having no animal food in any of the dishes. The Buddhist priesthood profess an abhorrence of taking away animal life or of eating animal food, and hence no food of the kind was observed on any of the tables now before me. On two strings which were hung diagonally across the court, from the central temple to each end of the front wall, were suspended numerous small paper dresses cut in Chinese fashion, and on the ground were large quantities of paper made up in the form and painted the colour of the

ingots of Sycee silver common in circulation. The clothes and silver were intended as an offering to Buddha—certainly a cheap way of giving away valuable presents. A rude painting of Buddha was hung up in the centre of the court, in front of which incense was burning,—and these with many other objects of minor note completed the picture which was presented to my view. "Is not this very fine?" said the priest to me; "have you any exhibitions of this kind in your country? You must pay a visit in the evening, when all will be lighted up with candles, and when the scene will be more grand and imposing." I promised to return in the evening, and took my leave.

About eight o'clock at night an old priest came to inform me that all was lighted up, that the ceremonies were about to begin, and kindly asked me to accompany him. On our entrance the whole court was blazing with the light of many candles, the air was filled with incense, and the scene altogether had an extraordinary and imposing effect. A priest dressed in a rich scarlet robe, and having a sort of star-shaped crown on his head, with four others of an inferior order, were marching up and down the court, and bowing lowly before the images of the gods. At last they entered the central hall, and took their seats at two tables. The high-priest, if I may call him so, occupied the head of the room, and had his chair and table placed on a higher level than the others, who were exactly in front of him. A servant now

placed a cup of tea before each of them, and the service began. The high-priest uttered a few sentences in a half-singing tone, making at the same time a great many motions with his fingers as he placed and replaced a number of grains of rice on the table before him. Two little boys, dressed in deep mourning (white), were engaged in prostrating themselves many times before the table at which the high-priest sat; and, as a singular contrast to all this seeming devotion, a number of Chinese were sitting smoking on each side, and looking on as if this was a play or some other kind of like amusement. The other priests had now joined in the chant, which was sometimes slow, and at other times quick and loud, but generally in a melancholy tone, like all Chinese music.

A priest who was sitting at my elbow now whispered in my ear that Buddha himself was about to appear. "You will not see him, nor shall I, nor any one in the place except the high-priest, who is clothed in the scarlet robe, and has a star-shaped crown on his head — he will see him." Some one outside now fired three rockets, and at once every sound was hushed; one might have heard a pin drop on the ground; and the priest at my elbow whispered — "Buddha comes." — "Prostrate yourselves: ah! pull your caps off," said one to the young priests in white, already noticed. The boys immediately took off their little white caps, and bent lowly on the straw cushions placed in front of the various altars, and

knocked their heads many times on the ground. At this particular moment the whole scene was one of the strangest it had ever been my lot to witness, and, although I knew it was nothing else than delusion and idolatry, I must confess it produced an almost superstitious effect on my feelings. "And is Buddha now here in the midst of us?" I asked the gentleman at my elbow. "Yes, he is," he said; "the high-priest sees him, although he is not visible to any one besides." Things remained in this state for a minute or two, and then the leader of the ceremonies commenced once more to chant in that drawling tone I have already noticed, to make various gyrations with his hands, placing and replacing the rice-grains, and the others joined in as before. My old friend the priest, who had brought me in to see these ceremonies, now presented himself and told me I had seen all that was worth seeing, that the services were nearly over, and that it was very late and time to go home. On our way to our quarters he informed me the funeral would take place early next morning, just before sunrise, and that if I wished to attend he would call me at the proper time.

Early in the twilight of next morning, and just before the sun's rays had tinged the peaks of the highest mountains, I was awakened by the loud report of fireworks. Dressing hastily, I hurried down to the house where the scene of the preceding evening had been acted, and found myself

among the last of the sorrowful procession. Looking into the court and hall, I found that the sacrifices had been entirely removed, the tables were bare, not a morsel of any kind remained, and it seemed as if the gods had been satisfied with their repast. The silver ingots, too, and the numerous gaudily-painted dresses which had been presented as an offering, were smouldering in a corner of the court, having been consumed by holy fire.

As the funeral procession proceeded slowly down, inside the covered pathway adjoining the temple, the large bell tolled in slow and measured tones, rockets were fired now and then, and numerous priests joined in as we went along. Having reached the last temple of the range, the body was deposited on two stools in front of one of the huge images, and, China-like, before proceeding further, all went home to breakfast. This important business finished, the assembly met again in the temple, and performed a short service, while the coolies were busily employed in adjusting the ropes by which they carried the coffin. All being ready, two men went outside the temple and fired three rockets, and then the procession started. First went two boys, carrying small flags on bamboo poles, then came two men beating brass gongs, and then came the chief mourner, dressed in white, and carrying on a small table two candles which were burning, some incense, and the monumental tablet. After the chief mourner came the coffin, followed by the young priests of the house to which

the deceased belonged, also clad in white, then the servants and undertaker, and last of all a long train of priests.

I stood on one side of the lake, in front of the temple, in order to get a good view of the procession as it winded round the other. It was a beautiful October morning; the sun was now peeping over the eastern mountains behind the monastery and shedding a flood of light on water, shrubs, and trees, while every leaf sparkled with drops of dew. In such a scene this long and striking procession had a most imposing effect. The boys with their flags, the chief mourner moving slowly along with his candles burning in the clear daylight, the long line of priests with their shaven heads and flowing garments, the lake in front, and the hills covered with trees and brushwood behind, were at once presented to my view. As we passed a bridge, a little way from the temple, a man belonging to the family of the deceased, and who carried a basket containing *cash*—a Chinese coin—presented a number of the followers with a small sum, which they received with apparent reluctance. Most of the priests followed the bier but a short distance from the temple; but the chief mourner, the intimate friends, and servants, with a band of music, followed the body to its last resting-place. The spot selected was a retired and beautiful one, on the lower side of a richly-wooded hill. Here, without further ceremonies than the firing of some rockets, we left the coffin on the

surface of the ground, to be covered with thatch or brickwork at a future opportunity.

The procession, or rather what remained of it, for it was now very small, returned to the temple. As we passed the small villages and cottages on our way the inmates crowded the doors, not to look at the procession, for such things were not unfrequent, but to express their wonder that a foreigner should have taken a part in it. When we arrived at the temple I looked in to see what was going on in the house from which the body had been taken, and in which such a strange scene had been acted the night before. It had been swept out, the tables had been put back into their proper places, two priests were quietly smoking their pipes in the verandah, the cook was preparing the forenoon meal in the back part of the house, and, except that that meal seemed more sumptuous than usual, there was nothing to indicate that a short time previous it had been the house of death. Such is life and death in China—not very unlike in some particulars what it is in other parts of the world.

In this part of the Chekiang province, and also amongst the Fung-hwa mountains to the westward of Ningpo, there are large quantities of a blue dye produced, which is in fact the indigo of this part of the country. Those who have read my 'Wanderings in China,' published in 1846, may remember the account given there of a valuable kind of indigo, made from a species of woad (*Isatis*

indigotica) which is cultivated extensively in the level country a few miles to the westward of Shanghae. The kind which attracted my attention in Chekiang is equally valuable, if not more so. It is made from a species of *ruellia*, which, until it gets a better name, may be called *Ruellia indigotica*. It is a curious circumstance that the same plant, apparently, has lately been discovered in the Assam country in India, where it is also cultivated for the blue dye it affords. I had an opportunity of examining it in the garden of the Agricultural and Horticultural Society at Calcutta, by whom it had been introduced, and where it was standing alongside of the Chinese kind, to which it certainly bears a most striking resemblance: the point of identity will easily be determined when the plants come into flower. Strange it will be if it is ultimately found that this species, which produces a dye unknown to commerce, is in cultivation all the way across from the eastern shores of China to the borders of Bengal, and this is far from being improbable.

This ruellia seems to be easily cultivated; it grows most luxuriantly, and is no doubt very productive. Having evidently been found indigenous a little farther to the south, in a warmer latitude, it is not hardy in the province of Chekiang any more than cotton is about Shanghae; but nevertheless it succeeds admirably as a summer crop. It is planted in the end of April or beginning of May, after the spring frosts are over, and is cleared

from the ground in October before those of autumn make their appearance. During this period it attains a height of a foot or a foot and a half, becomes very bushy, and is densely covered with large green leaves. It is cut down before any flowers are formed.

The Chinese method of preserving plants for next year's crop is most ingenious and well worth notice. Being somewhat tender, as I have already remarked, the roots which are left in the ground after the gathering season are all destroyed by the first frosts of winter. But the Chinese cultivator does not depend upon these for the crop of the following year, nor does he take them up or cover them in any way. They have done their duty for one year, and are now left to their fate.

Cuttings are found to be much more vigorous and productive than the old roots, and to the formation and preservation of these cuttings the Chinese cultivator directs his attention. When the stems are cut down for the manufacture of indigo, a sufficient quantity have their leaves stripped off, and are afterwards taken into a house or shed to be properly prepared. The leaves thus stripped from the cuttings are thrown into the tanks with the other stems and leaves, so that nothing is lost except what is actually required for the purposes of propagation. The stems are now tied up firmly in large bundles, each containing upwards of 1000, and the ends of each bundle are cut across, so as to leave them perfectly neat

and even both at top and bottom. These bundles are each about a foot long, and, of course, nearly round. Having been thus prepared, they are carried to a dry shed or outhouse, where, in some snug corner, they are packed closely and firmly together, and banked round with very dry loam. A portion of the dry soil is also shaken in between the bundles; and this being done, the operation is complete. Should the winter prove unusually severe, a little dry straw or litter is thrown over the surface of the cuttings, but nothing else is required. During the winter months the cuttings remain green and plump; and, although no leaves are produced, a few roots are generally found formed, or in the act of forming, when the winter has passed, and the season for planting has come round. In this state they are taken to the fields and planted. The weather during the planting season is generally showery, as this happens about the change of the monsoon, when the air is charged with moisture. A few days of this warm showery weather is sufficient to establish the new crop, which now goes on growing with luxuriance, and requires little attention during the summer—indeed none, except keeping the land free from weeds.

In the country where this dye is grown there are numerous pits or tanks on the edges of the fields. They are usually circular in form; and one which I measured was eleven feet in diameter, and two feet in depth. About 400 catties* of

* A Chinese catty is equal to 1⅓ lb.

stems and leaves are thrown into a tank of this size, which is then filled to the brim with clear water. In five days the plant is partially decomposed, and the water has become lightish-green in colour. At this period the whole of the stems and leaves are removed from the tank with a flat-headed broom made of bamboo twigs, an admirable instrument for the purpose. When every particle has been removed, the workmen employed give the water a circular and rapid motion with the brooms just noticed, which is continued for some time. During this part of the operation another man has employed himself in mixing about thirty catties of lime with water, which water has been taken out of the tank for the purpose. This is now thrown into the tank, and the rapid circular motion of the water is kept up for a few minutes longer. When the lime and water have been well mixed in this way the circular motion is allowed to cease. Four men now station themselves round the tank and commence beating the water with bamboo rakes made for this purpose. The beating process is a very gentle one; as it goes on the water gradually changes from a greenish hue to a dingy yellow, while the froth becomes of a beautiful bright blue. During the process the head workman takes a pailful of the liquid out of the tank and beats it rapidly with his hand. Under this operation it changes colour at once, and its value is judged of by the hue it presents. The beating process generally lasts for about half an

hour. At the end of this time the whole of the surface of the tank is covered with a thick coating of froth of the most brilliant colours, in which blue predominates, particularly near the edges.

At this stage, it being desirable to incorporate the froth with the liquid below it, I witnessed a most beautiful chemical operation which took me completely by surprise, and showed how universally must be the knowledge of the effect of throwing "oil upon the waters." A very small portion of cabbage-oil—only a few drops—was thrown on the surface of the froth, the workmen then stirred and beat it gently with their flat brooms for a second or two, and the whole disappeared as if by some enchanter's wand. And so small a quantity of oil was necessary for this purpose that even when the cup had been emptied, and had only the oil that was necessarily adhering to its edges, it was thrown into another tank, and produced the desired effect.

The liquid, which is now darker in colour, is allowed to stand quiet for some hours, until the colouring matter has sunk to the lower stratum, when about two-thirds of the surface is drawn off and thrown away. The remaining third part is then drawn into a small square tank on a lower level, which is thatched over with straw, and here it remains for three or four days. By this time the colouring matter has separated itself from the water, which is now entirely drained off—the dye occupying three or four inches of the bottom in the form of a thick paste, and of a beau-

tiful blue colour. In this state it is packed in baskets, and exposed for sale in all the country towns in this part of China. What its intrinsic value may be when compared with the indigo of commerce, I have no means of ascertaining, but it is largely used in this part of the world, where blue is the most fashionable colour, judging from the dresses of the people. And it is possible that with our knowledge of chemistry a colour of this kind might be greatly improved. After being grown and manufactured as I have described, it is sold at rates varying from 50 to 100 cash a catty, say from 2*d.* to 4*d.* per lb. Some is sold as low as 30 cash, but this is very inferior; the greater part produced is sold at from 60 to 80 cash a catty, and it must be of a very superior quality if 100 cash is paid. Like the Shanghae indigo made from *Isatis indigotica*, it is called "Tien-ching" by the Chinese. While upon the subject of Chinese dyes, I shall now give some account of the "green indigo," which has been attracting much notice lately both in India and in Europe.

A portion of cotton cloth obtained in China by the French manufacturers, being greatly admired on account of the peculiar green of its dye, was submitted to the celebrated chemist M. Persoz. with a request that he would endeavour to ascertain the composition of the green colour. The following is a translation of his report upon this subject to the Academy of Sciences:—

ON A GREEN COLOURING MATERIAL PRODUCED IN CHINA.

By Mons. J. Persoz.

I have the honour to place before the Academy a specimen of a colouring material used in China as a green dye for textile fibres. With the permission of the Academy I will briefly state how I was led to a knowledge of the existence of this dye.

Mons. Daniel Koechlin-Schouc forwarded to me last autumn a specimen of calico dyed in China, of a rich and very permanent green, with a request that I should endeavour to ascertain the composition of the green colour. Every attempt that I made upon the specimen to detect evidence of the presence of a blue or yellow failed, and I was led to the conviction, by isolating the colouring principle, that the green was produced by a dyeing material of a peculiar nature and *sui generis*. It further was evident,—

1st. That the colouring matter was an organic product of vegetable origin;

2nd. That the fabric on which it was fixed was charged with a strong dose of alum and a little oxide of iron and lime, bodies the presence of which necessarily implied that mordants had been used in dyeing the calico.

These results were so positive, and at the same time so opposed, not only to everything known in Europe regarding the composition of green colour, but also to all that is recorded by writers regarding the dyeing processes employed in China for the production of green, that I was induced to go into a more detailed investigation of the subject; and about the end of last November I applied to Mr. Forbes, the American consul at Canton, for some of this valuable material. I am indebted to his kindness for a specimen weighing about one gramme ($15\frac{1}{2}$ grains).

The substance is met with in thin plates, of a blue

colour, having a strong analogy with that of Java indigo, but of a finer cake, and differing besides from indigo both in its composition and in all its chemical properties. On infusing a small fragment of the substance in water, the liquid speedily became coloured of a deep blue, with a shade of green. After the temperature had been raised to the boiling point, a piece of calico, prepared for printing with mordants of alum and oxide of iron, was dipped in it, and a true dye was the result. The following appearances were observed:—

The portions of the fabric to which alum had been applied showed a deep green, of more or less intensity, according to the strength of the mordant.

The portions charged with both alum and oxide of iron yielded a deep green, with a shade of olive.

The portions charged with oxide of iron alone yielded a deep olive.

The parts of the cloth where no mordant had been applied remained sensibly paler.

The colours thus obtained were treated with all the reagents to which the Chinese calico had in the first instance been subjected, and they behaved in precisely the same manner. From these experiments it may be inferred,—

1st. That the Chinese possess a dye-stuff presenting the physical aspect of indigo, which dies green with mordants of alum and iron.

2nd. That this dye-stuff contains neither indigo nor anything derived from that dyeing principle.

Mons. Legentil, President of the Chamber of Commerce of Paris, having perceived the importance of France being speedily put in possession of this valuable material, with a view to the interests of science and of industry, took the necessary steps several months ago for procuring a suitable quantity with the least possible delay, and, at the same time, to have inquiries made as to its origin and mode of preparation.

I purpose submitting to the Academy a full account of this new dye as soon as I am enabled to make a more detailed and satisfactory examination of it.*

This matter attracted a good deal of notice both in France and in England, and the officials of both countries stationed in China were written to by their respective governments and desired to get what information they could upon it. But in China it is a difficult matter to obtain correct information upon anything which does not come directly under one's eye; and if the correspondence upon this subject was published, it would, no doubt, exhibit as many amusing blunders as used to be made about the Chinese rice-paper plant in former days. By some the flowers of the Whi-mei (*Sophora japonica*) were sent home as the "green indigo;" but this plant yields a yellow dye, and, even when mixed with blue to make a green, the green is not that kind noticed by the French manufacturers.

From an extensive knowledge of the productions of China, gained during several years of travel, I was not so easily imposed upon as others, but notwithstanding this advantage it was some time before I could be sure that I was "upon the right scent." At last I remembered having seen a peculiar kind of dye cultivated largely some miles to the westward of Hang-chow-foo, and I determined to visit that part of the country again,

* Translated from the 'Comptes Rendus de l'Académie des Sciences.' Séance de Lundi, 18 October, 1852.

and examine the dye more minutely. Here I found fields under cultivation with a kind of *Rhamnus* apparently. The Chinese farmer called it "Loh-zah," or "Soh-loh-shoo," and showed me samples of the cloth which had been dyed with it. To my delight these samples corresponded exactly with those sent back from France, one of which was in my possession. But he told me that two kinds were necessary — namely, the variety they cultivated in their fields, and one which grew wild on the hills—in order to produce the dye in question. The former they called the *yellow* kind, and the latter the *white* kind. The dye itself was not extracted by them, they were merely the growers, and therefore I could get no information as to its manufacture. I however secured a good supply of plants and seeds of both kinds, which were afterwards sent to India and England.

My further inquiries on the subject of the manufacture of the "green indigo" were conducted in connexion with Dr. Lockhart and the Rev. J. Edkins, of Shanghae. We found that a considerable portion of this dye was made near a city called Kia-hing-foo, situated a few miles west from Shanghae, and Mr. Edkins procured a bundle of chips there which exhibited the state in which the article is sold in the market. Since I left China I have received the following interesting letter from Dr. Lockhart, which throws much light on the subject. The information was pro-

cured by Mr. Edkins, and may therefore be fully relied upon.

"The bark of two kinds of the tree known as the 'green shrub' (Lŭk-chae), one wild, which is called the *white*, and another cultivated, which is called the *yellow*, are used to obtain the dye. The white bark tree grows abundantly in the neighbourhoods of Kea-hing and Ningpo; the yellow is produced at Tsăh-kou-pang, where the dye is manufactured. This place is two or three miles west from Wang-tseen, a market-town situated a little to the south of Kea-hing.

"The two kinds are placed together in iron pans and thoroughly boiled. The residuum is left undisturbed for three days, after which it is placed in large earthenware vessels, and cotton cloth, prepared with lime, is dyed with it several times. After five or six immersions the colouring matter is washed from the cloth with water, and placed in iron pans to be again boiled. It is then taken up on cotton yarn several times in succession, and when absorbed in this way it is next washed off and sprinkled on thin paper. When half dry the paper is pasted on light screens and strongly exposed to the sun. The product is called Lŭk-kaou. In dyeing cotton cloth with it ten parts are mixed with three parts of subcarbonate of potash in boiling water.

"The dye made at Tsăh-kou-pang is not used to dye silk fabrics, because it is only a rough surface which takes it readily. To colour silk

with it so much of the material must be used that it will not pay. All cotton fabrics, also grass-cloths, take the colour readily. *The dye does not fade with washing, which gives it a superiority over other greens.*

"It is sent from Kea-hing as far as Shantung. It is also made in the province of Hoonan and at Ningpo, but the dye at these places is said to be of an inferior quality. It has long been used by painters in water-colours, but the application of it to dye cloth was first made only about twenty years ago. If some method could be discovered of applying it to silk fabrics it would become still more useful."

The information obtained by Mr. Edkins on this subject is, no doubt, perfectly correct. It agrees in the most important particulars with what I had gleaned from time to time amongst the Chinese in various parts of the country. The chips he brought with him from Kea-hing were identical with the "Soh-loh," or "Loh-zah" (Rhamnus sp.), which I have already mentioned, and his statement that two varieties of the plant are used to produce the dye agrees with my own observations.

The mode of extracting the dye from the bark or wood (for both seem to be used), as practised by the Chinese, appears to be slow and tedious, but with our superior knowledge of chemistry this might possibly be improved.

From these investigations it would appear that

two colouring principles are necessary to the production of this dye. This, however, will not affect the value of it as a rich and *permanent* green, a quality which has been appreciated by the French manufacturers, and which is also well known to the Chinese.

CHAPTER IX.

Journey to the Snowy Valley and waterfalls — Kong-k'how pagoda — Adventure with a blind man — Elaborate carving — A new acquaintance, Mr. A-chang — Iron-ore — Mountain stream — Its rafts and cormorants — The temple of the Snowy Valley — Description of the falls — Our dinner and guests — How Mr. A-chang enjoys it — His lecture on medical botany and lucky spots for graves — A Buddhist recluse — Continue our journey across the mountains — Natural productions — Fine variety of bamboo — Its introduction to India — Romantic glen — Arrive at our boats and bid adieu to Mr. A-chang.

During my travels in the province of Chekiang I had frequently heard of some celebrated waterfalls near a place named Seue-tow-sze, or the "Snowy Valley Temple," which is situated amongst the mountains some forty or fifty miles to the south-west of the city of Ningpo. Having not been in this direction, and being anxious to examine the natural productions of these hills, I determined on paying a visit to the falls.

Leaving Ningpo about mid-day, with the first of the flood-tide, a party of English gentlemen and myself sailed rapidly up the river in some small country boats which we had hired for the journey. The country through which we passed, and which may be called the plain of Ningpo, is perfectly level, and is not remarkable for any striking feature; but it is exceedingly fertile and produces

large crops of rice, which is the staple food of the inhabitants. It is thickly covered with small towns, villages, and farm-houses; and, like all the fertile plains in China which have come under my observation, it teems with population. As our boatmen went on during the night, we found ourselves next morning at the base of the hills which bound the plain on the south-west, and in the district of Fung-hwa. On one of these hills stands a pagoda named *Kong-k'how-tâ*, which is visible for many miles, and from which an excellent view of the low country is obtained. Making our boats fast to the river-bank, we stepped on shore and took the first turning which led to the hill on which the pagoda stands. When we reached the summit of this hill, which appeared to be about 1000 feet above the level of the sea, we were rewarded with one of those splendid views which are, perhaps, more striking in the fertile districts of China than in any other country. Beneath us, and stretching to the north and eastward, was the level plain through which we had passed during the night. The city of Ningpo occupied its centre, and it seemed bounded on all sides, except the north and east, by hills and mountains varying in height from 1000 to 3000 feet—while far away to the eastward lay the islands of the Chusan archipelago, studded about in the China Sea. From this pagoda one can count six or seven others, each of which marks the position of some ancient city in the plain, or Buddhist monastery on the

hills. Towns and villages were visible in whichever direction our eyes were turned, and every part of the extensive plain appeared to be under cultivation. Indeed industry and perseverance seem to be absolutely necessary in order to make the ground yield food for such a mass of human beings. If the population of the country really amounts to more than three hundred millions—and there seems to be no reason to doubt this—and taking into consideration that a vast extent of its surface is covered with mountains so barren that they must ever defy all attempts at cultivation, the valleys and other portions of cultivated land would require to be fertile indeed, and to have a nation as industrious and persevering as the Chinese to make the ground productive.

On ascending the hill, and examining its natural productions as I went along, I somehow or other got off the little pathway, and found myself all at once brought up by a fence which seemed to enclose a small monastic building. Inside of this fence there were a number of trees and bushes which seemed worth looking at, and I was also desirous of seeing the little temple itself. Following the fence some way round in the hope of finding an entrance, the ground began to get very rugged, and my progress was greatly impeded. At last I thought there would be no great harm in jumping over the fence, which I could easily do, as it was only four or five feet in height. No sooner did the idea enter my mind than it was put

into execution, and I was inside the enclosure in a moment. A number of watch-dogs, which I had disturbed, came running towards me, looking very fierce and making a loud noise. Chinese dogs are generally harmless enough and great cowards, so that in this instance, with a good stout stick in my hand, I felt no alarm whatever, but went quietly on with my botanical researches. In a few seconds an old man, who had been disturbed by the barking of the dogs, came rushing towards me with a stout bamboo in his hand, and looking as if he intended to use it. He was evidently in a towering passion. "Where had I come from?" "What did I want?" "Why had I come over the fence?" were questions which he put loudly and rapidly, interspersing them from time to time with remarks which were not at all flattering to my character or intentions. I knew that I had done wrong, but the offence seemed slight comparatively, and one which a stranger and a foreigner in China might commit without being called to account for it in this boisterous manner. I remonstrated with the old man, commencing in the most polite and approved manner by asking him "if he had had his breakfast?"* I then told him, when I could get a word in, that I was no thief, that I had merely come to pay him

* This is a polite mode of salutation amongst the Chinese, not unlike our own way of making remarks upon the weather. It is related of a loving couple who had been separated for many years, that the first words the wife said to her husband were—"Have you had your dinner?"

a visit, and that if he treated me so rudely I would go away again. Matters were in this state, when a young man came running up to the old one, smiling and making a low bow to me at the same time. This new actor on the scene whispered a word or two into the old man's ear, one of which sounded very like *Hong-mou-jin* (foreigner). In the twinkling of an eye his countenance changed, the storm had passed into sunshine, his bamboo was thrown from him, and, clasping the palms of his hands together, he made me a low bow and asked me to forgive him, *for he was blind.* It was indeed so, and hence the whole cause of the strange, and, to me, unaccountable scene in which I had been one of the actors. I was now surprised at my own blindness in not detecting this before; but the whole thing occurred so suddenly that I had little time for observation.

The old man, now all smiles and good-humour, led me round his garden — blind, stone-blind, though he was — and told me the names of his various trees and shrubs, and the uses to which each was applied when it happened that it had any virtues in medicine, or if it "was good for food." I was then led into his house, where I was invited to partake of the usual beverage — tea. Remaining for a few minutes to accept his hospitality, I bade him adieu, and joined my companions on the top of the hill.

After inspecting the pagoda we proceeded onwards in our boats to a place called Too-poo-dow,

which is a few miles further up the river and as far as it is navigable for boats. We remained here for the night, and made preparations for a land-journey to the Snowy Valley, which we determined to take on the following day. Early next morning, while breakfast was getting ready, we went to see a pretty, small temple called the Sieu-Wang-Meou, which the people told us was well worth visiting. This temple is finely situated on a small hill, having rich woods behind and the river winding past in front,—but as a building it is chiefly remarkable for a most elaborately carved stone altar —the finest specimen of the kind which I have met with in China. While engaged in examining this curious work of Chinese art, a respectable-looking old man came running breathless into the temple and introduced himself as Mr. A-chang, and told us he was a mandarin or small government officer connected with the temple. A slight glance at his features told us he was no common man. He was most loquacious and particularly civil and obliging; he went all over the edifice with us, explaining, or endeavouring to explain, the elaborate carving of the altar and the various rude pictures which covered the walls. Having a long journey before us, we had little time to spare, and were, therefore, obliged to take a hurried leave of our obliging friend, who told us he would pay us a visit at our boats before we started for the Falls. We had just finished breakfast, when to our surprise the old gentleman presented him-

self, dressed, and evidently prepared for a journey. "Ah!" said he, "I told you I would see you before you started, and I have made up my mind to go with you and show you the road." As he seemed a most amusing character, and, moreover, was most useful in enabling us to make arrangements with coolies and chair-bearers, we made no objection to his joining our party. And we had no reason to regret the circumstance, for he was invaluable as a guide and afforded a rich fund of amusement. Our coolies being at last engaged and loaded with some few necessaries, and our mountain-chairs all ready, we despatched our boats to another part of the country—a place called Ning-kang-jou, some miles further west and on another branch of the river.

About twenty or twenty-five miles south-west from Too-poo-dow there is a beautiful mountain-pass called by the natives Yang-ling. Here, in addition to the common trees of these mountains, the funereal cypress grows in great abundance, and forms a striking feature in the landscape. This part of the country is said by the Rev. Dr. Medhurst to be rich in iron-ore. At a place called Sha-k'he there is an iron-foundry. "The furnace for melting the iron was about five feet high and three feet in diameter, filled to the brim with charcoal and iron-ore. The blast was formed by a rude box-bellows, and at the time we arrived the whole was in a state of operation. We asked them from whence they obtained their iron-ore, and they pointed to

the adjoining stream, from the bottom of which they obtained large quantities of black sand, which was for the most part iron. Having melted it in this furnace, and formed cakes of raw iron, about a foot square and an inch thick, they then brought it to the forge, and reduced it to the state of wrought iron, in blocks four inches long by two wide and one thick. This they carried to the market and sold." *

From Too-poo-dow to the Snowy Valley the distance is about nine or ten miles. Headed by our mandarin friend, and surrounded by hundreds of the natives of both sexes, old and young, we started on our journey. The road, which was a narrow footpath, led us up the valley and every now and then we approached the banks of the stream, which was now quite narrow, shallow, and in some places very rapid. Although no longer navigated by boats, it was still made to serve the purpose of the industrious inhabitants in a number of other ways. Small rafts, made by lashing a few bamboo poles together, were plying about in all directions, bringing the productions of the hills down to Too-poo-dow, where they could be put into boats and so conveyed onwards to the lowland towns for sale. Large quantities of basket-tea, liquid indigo, paper, mats, wood, and such-like hill productions were observed coming down the river in this way. Fish seemed most abundant in the little stream; and as it was now far beyond the

* Rev. Dr. Medhurst, in N. China Herald.

influence of tides and clear as crystal, my old friends, the fishing cormorants, were employed in catching large fish for their masters and small ones for themselves.

The valley through which we passed, although in many places very sandy from the effects of the swelling of mountain-streams, was yet generally rich and fertile. On the road, at stated distances apart, were covered resting-places for travellers, where shelter from a storm or shade from the noonday sun might be had by rich or by poor. Little villages and farm-houses were observed clustered about in various directions, and the labourers who were at work in the fields seemed happy and unoppressed. Looking upon a quiet scene like this, one could scarcely believe that a civil war was raging in the country, not a greater distance off than 100 miles, where acts of savage cruelty were daily perpetrated which made one's blood run cold. Yet such was the fact.

After winding up the valley for about six miles we came to the foot of a mountain-pass, and began gradually to ascend. As we reached a higher elevation, the scenery became more varied in appearance than it had been in the plain, and very beautiful. We were surrounded by hills and mountains of every conceivable form,—some were peaked, precipitous, and barren, while others sloped gently upwards, and were covered densely with pines and brushwood. Far away down in the valley below us, the little stream, at whose source

we had now arrived, was seen winding its way amongst the hills, and hastening onwards to swell the noble river which flows past the city of Ningpo.

When we arrived at the top of the pass we found ourselves at the entrance of the Snowy Valley, which lay a little beyond, and nearly at the same elevation, estimated at about 2000 feet above the level of the sea. This valley is surrounded on all sides by mountains. At one point is the pass which I have just noticed, and at another is an opening for a small mountain-stream, which, as it leaves the valley, falls over a precipice of rocks into a glen some three or four hundred feet below, and forms the noble falls we had come to see. The temple of the Snowy Valley, an old and dilapidated Buddhist building, occupies the centre or upper end of the valley, and to that we proceeded in order to procure quarters for the night for ourselves and our coolies. Here we found our old Chinese friend ready to receive us, and, with the priests of the monastery, gave us a cordial and hearty welcome. It was now late in the afternoon, within an hour of sunset; but as our baggage had not arrived, we determined to go out and visit the upper part of the falls, reserving the lower or glen view until the following morning. To our surprise, Mr. A-chang—who had walked all the way, and who we supposed must be very tired—intimated his intention of accompanying us. We therefore set out with him as our guide, and in a

few minutes we reached the edge of the valley and heard the noise of the falls. As we followed our guide along a small path, through trees and brushwood, we were scarcely prepared for the view which was about to be presented to our eyes. All at once we arrived at the edge of a precipice, which made us quite giddy as we looked over it. The water rolled out of the valley over the precipice, and long before it reached the bottom it was converted into showers of spray. Far below us was a deep and narrow glen, through which the little stream was quietly meandering after leaving the falls. As we skirted the mountains on the west side of the Snowy Valley we found our progress every now and then arrested by perpendicular rocks such as I have just noticed; and during the rainy season there are several other falls, which, our guide informed us, were not much inferior in beauty to that which we had just visited.

As it was now nearly dark, and rather dangerous work travelling amongst such scenery, we retraced our steps to the old monastery. Here we found our coolies had arrived with our beds and other necessaries, and the cook was busy preparing dinner. When our meal was ready we requested Mr. A-chang to honour us with his company, and all sat down with a full determination to do justice to the viands before us, and for which the long journey and fresh air of the mountains had made us fully prepared. A-chang seemed to relish the dinner—English though it

was—as much as any of us. He ate with knife and fork, tossed off his glass of beer, and took wine with us all round, in the most approved manner. When dinner was over he asked for a cigar and a glass of brandy and water, and evidently intended to enjoy himself for this evening at least. In order to amuse and humour him we proposed his health with "three times three," and made the old temple ring again as we gave him a specimen of our national airs, 'Rule Britannia' and 'God save the Queen.' But the old man was not to be outdone: he returned thanks to us for drinking his health: he recited poetry of his own; sang Chinese songs; and every now and then burst out into a hearty laugh, which we could not help joining in without knowing very well why we did so. The court outside was full of Chinamen, who were evidently enjoying with great zest Mr. A-chang's songs and recitations. Inside, perched upon a chair, sat a young priest, with his eyes fixed upon the bottles on the table. An empty beer-bottle had been given to him at the commencement of dinner, and his whole soul seemed to be bent on getting another. He neither moved, smiled, nor spoke, but looked on in a dreamy manner, and never took his eyes off the bottles. Our attention was drawn to the boy by this singular proceeding, and we desired one of the servants to find another bottle and give it to him, which having been done, the little fellow disappeared for the night.

As we were all rather tired with the day's exertions, we felt an inclination to retire early to rest. We had some difficulty in inducing our mandarin friend to leave us, as he was evidently prepared to "make a night of it;" but as Englishmen have degenerated very much, and cannot imitate now the noisy drunken squires of the olden time, we gave him sundry hints, which he took at last, and left us to our own meditations. We were now shown into a wretched room in which were placed some five or six bedsteads, on each of which was a dirty straw mat, with some straw below it. The mats and straw were removed by our servants, the rude bedsteads were dusted down, and our own clean things then put in order. Retiring immediately our friend left, we were soon sound asleep.

We rose early next morning, and as we were dressing by candle-light we heard the clear, loud laugh of Mr. A-chang, who was already dressed and prepared to conduct us to the glen below the falls. After passing the compliments of the morning, he begged a cigar to smoke as we went along. Leaving the falls on our right hand, we crossed the ridge of hills at the end of the glen and descended on the opposite side. When we neared the bottom we obtained a fine view of the falls in all their grandeur. The rocks over which the water came seemed so precipitous that it scarcely touched them until it nearly reached the bottom, some three or four hundred feet below. As we

wandered down the glen, by a little mountain road which ran parallel with the stream, we obtained an excellent view of the rugged and perpendicular cliffs above us. I thought I could discern points of connexion between the two sides of the glen, which proved it to have been formed by some earthquake, or other convulsion of nature, out of a mountain which had been thus rent asunder.

Our guide now astonished us by coming out in a new character. Seeing me pay some attention to the botany of the district, he immediately began to give me a lecture upon the uses of the various trees and herbs we met with. "This," said he, "is the *Tung-oil* tree, which yields a valuable oil, much used by carpenters; this is the *Lew-san* tree (*Cryptomeria Japonica*), valued for its ornamental appearance and fine timber." Seeing a fine species of gentian in full bloom, I asked him whether it was of any value. "Oh, yes," he replied, "it is a valuable medical plant, and is used by the doctors—it is an excellent stomachic." And so on he went, explaining to us the uses of almost every plant we met with on the roadside as we went along. "You are a very wise man, you seem to know everything," said I to him,—and I was quite in earnest, and intended this for no unmeaning compliment. The old man smiled; he was evidently much pleased, and replied, "I also understand *Fung-shwuy* (soothsaying); I can tell the proper positions for graves—see, here is

the compass I employ to find the proper direction." As he said this, he took out of his pocket a mariner's compass, and put it into my hand. He then offered to give me a lesson on his art, for which I expressed my gratitude,—and he began in the following way. "This spot," said he, "which you see formed out of the hill-side, and on which some Indian corn has been growing during the past summer, has been selected for a grave." "And why has this particular spot been selected," I asked; "what are its peculiar merits?" "Look around you," said he; "look at the beautiful hills on your right hand and on your left; see the falls in the distance, and the little stream winding quietly down the glen below; change the scene, and carry your eyes to the far-off hills in front of you, where another stream is flowing towards us and joining that which has left the falls; look at the green fields on its banks and the richly-wooded, undulating hills behind; look at all these, and then you will answer your own question." It was, indeed, a lovely spot, and one which did not require the eloquence of Mr. A-chang to make me feel that it was so. On our way up the hill we came to another place, which at first sight appeared equally beautiful; I called his attention to this, and asked him whether it was not quite equal to the last. "Oh, no," he said: "look behind you; don't you see that furrow in the hill which would bring the water down upon the grave? No, no; this place is very

well for a rice-field, but it will not answer for a tomb."

Much pleased with our descent into the glen below the falls, we now returned to the temple to make preparations for resuming our journey. While breakfast was getting ready, I paid a visit to the Superior, or High Priest, who had been discovered in a small room or kind of cell by one of our party the evening before. He was in voluntary confinement, and had been in this place for nearly three years. The door of the cell was padlocked on the outside, and he received his food and was communicated with through a hole in the wall. He seemed a respectable-looking, middle-aged man, rather corpulent for a Buddhist priest, and his confinement did not seem to disagree with him. He informed me the time of his voluntary penance would expire in the third month of the following year, and then he would leave his cell and return again to the world. I believe such examples of voluntary penance are not unusual amongst the Buddhist priesthood. I saw another in the old temple of Tein-tung; he was a native of Hang-chow-foo, the capital city of the province. He told me he had already spent nine years of his life in voluntary seclusion,—that is, he had been shut up three times, and for three years each time. When I made his acquaintance he was undergoing his fourth three years. This man was a very superior specimen of the Buddhist priesthood, open and frank in his manners, and was much

more intelligent than these persons generally are. However much deluded I considered him, I was inclined to believe him sincere.

These recluses are supposed to spend their whole time in prayer, in reading Buddhist books, and in repeating the name of Buddha over and over again continually. A small lamp burns day and night in their cells, and the listener hears the low and monotonous sound of Ameda Buddha, or Nae-mo-o-me-to-fa; and if he looks in upon them through the little aperture in the wall which is used for passing in their food, he will see them either counting their beads as an accompaniment to their devotions, or prostrating themselves before a little altar in the cell.

When a number of these priests are shut up in one cell, it is said that prayer to Buddha, or the repetition of his name, never ceases day nor night. When some become weary and feel the want of sleep, others take their places, and so the work goes continually on and on, until the three years have expired, when the holy men come out again to mix with the world.

Before leaving the temple our party went in a body to the window of the high-priest's cell to thank him for the shelter we had received during the night, and to leave him a small present for the kindness. He seemed much gratified with our attention, and we parted the best of friends, and with a kind invitation to renew our visit in the following year.

Our beds and the few necessaries we had brought with us being packed up, we loaded our coolies and bade adieu to the temple of the Snowy Valley. I have already stated that the valley is estimated at about 2000 feet above the level of the sea. Leaving it by a narrow road on its northern side, we began to ascend another pass, which led us nearly up to the top of the highest mountain-range, and which cannot be less than 3000 feet in height. For several miles our view was entirely bounded on all sides by hills varying in height and form. Every now and then our road led us down into a narrow valley, out of which we had to climb again to the top of another hill of the same elevation as the preceding.

These mountains were but thinly populated; but wherever the soil was at all fertile we found little clusters of farm-houses, whose inhabitants seemed much surprised at our appearance as we passed along. With their wonted politeness and hospitality, they pressed us to enter their houses and partake of the only beverage they had to offer us, which was tea. The tea-bushes were noticed growing plentifully on many of the hill-sides; but the produce in this part of the country is entirely used by the natives themselves, and not made up for the foreign market. Wheat and barley, with various other green crops, are cultivated in winter and reaped in spring or during the early summer months. The summer crops consist of sweet potatoes, two kinds of millet, one of buckwheat, and

an excellent variety of Indian corn. A small quantity of rice is also grown in the valleys; but the land capable of producing the crop is not very extensive.

Many of these hills are well wooded. I remarked as we went along good forests of Chinese pine (*Pinus sinensis*), the Japan cedar (*Cryptomeria Japonica*), and the lance-leaved fir (*Cunninghamia lanceolata*). The forests of the Japan cedar and the lance-leaved pine were extremely picturesque and beautiful. The trees generally were young and not remarkable for size, but were growing vigorously, and likely, if allowed to stand for a few years, to make valuable timber. In addition to this consideration, there were a symmetry and grace in the general appearance of these forests which one rarely sees in temperate climates, if we except perhaps the Himalaya mountains. The hemp-palm (*Chamærops sp.*) — a tree of great importance to the Chinese in a commercial point of view, on account of the sheets of fibre which it produces yearly on its stem — also occupied a prominent place on the sides of these mountains; and the graceful *mow-chok* — the most beautiful bamboo in the world — was grouped about in wild profusion.

This bamboo I have never met in any other part of the world. In the central and eastern provinces of China it is largely cultivated, particularly on the sides of mountains where the soil is rich, and in the vicinity of temples and other

monastic buildings. Its stems are straight, smooth, and clean, the joints are small, it grows to the height of from sixty to eighty feet. Twenty or thirty feet of the lower part of its stem are generally free from branches. These are produced on the upper portion of the tree, and then they are so light and feathery that they do not affect the cleanness of the main stem. In addition, therefore, to the highly picturesque effect it produces upon the landscape, it is of great value in the arts, owing to the smoothness and fineness of its structure. It is used in the making of sieves for the manipulation of tea, rolling-tables for the same purpose, baskets of all kinds, ornamental inlaid works, and for hundreds of other purposes, for which the bamboo found in India is wholly unsuitable.

Like all other species of the same tribe, it grows with great rapidity and perfects its growth in a few months. To use a common expression, "one could almost see it growing." I was in the habit of measuring the daily growth in the Chinese woods, and found that a healthy plant generally grew about two feet or two feet and a half in the twenty-four hours, and the greatest rate of growth was during the night.

The young shoots just as they peep out of the ground are highly esteemed as food, and are taken to the markets in large quantities. I was in the habit of using them as a vegetable every day during the season, and latterly was as fond of

them as the Chinese are themselves. Sometimes I had them split up, boiled, and dished by themselves; at other times they were used in soup, like cabbage; and on one occasion Mr. Forbes, the American consul in China, to whom I recommended them, taught me to make an excellent omelette, in which they formed one of the ingredients.

In the south of China, that is about Hongkong and Canton, several kinds of the bamboo are very common. There is a yellow variety with beautiful green stripes, painted on its stems as if done by the hand of a most delicate artist. But all these kinds resemble the Indian varieties,—that is, they grow in dense bushes, their stems are not remarkable for their straightness, and the large joints and branches, which are produced on all parts of the stem, give it a rough surface, and consequently render it unsuitable for fine work.

These tropical, jungley-looking bamboos disappear as we go to the more northern latitudes; and in their places we have the *mow-chok*, already mentioned, the *long-sin-chok*, the *hoo-chok*, and one or two others, all with clean stems and feathery branches, suited for the most delicate kinds of work, and all "good for food." These trees are well worth the attention of people who inhabit temperate climates, such as the south of France, Italy, and other parts of the south of Europe. No doubt they would be well worth introduction to some parts of Australia, New Zealand, and the

southern portions of the United States of America. In the province of Chekiang the maximum summer heat is from 90° to 100° in the shade, but only a few days in the months of July and August so high; in winter the thermometer (Fahr.) is rarely so low as 20°. Those interested in this matter may consult my 'Wanderings in China,' and 'Journey to the Tea Countries,' for fuller accounts of the climate of this part of China. With regard to soil and situation, it should be remarked that these trees invariably grow in a rich yellow loam on the slopes of the hills.

I have succeeded in introducing the mow-chok to India, and at no very distant day it may be seen flourishing on the slopes of the Himalaya in the north-western provinces, where the bamboos are very inferior. Several plants were also sent to the Agricultural and Horticultural Society of India, and reached Calcutta in good condition.

Amongst the other productions of these highland valleys, the *ruellia*, formerly noticed, is cultivated extensively for the blue dye which it affords. During the season of its preparation every mountain-stream is coloured and polluted with the refuse liquid drawn off from the tanks, and the stench which fills the air is almost unendurable.

We travelled about thirty *le*—eight or ten miles—across these mountains, which brought us to a little village named Le-tsun, where large quantities of the blue dye just noticed are grown and manufactured. This little highland village is situated

at the head of a glen which opens by various windings to the plain of Ningpo. As we had other thirty *le* to go before we reached our boats, we rested ourselves in an old joss-house in order to allow our baggage to come up with us. Here the natives crowded round us in hundreds, evidently delighted to get a view of the far-famed *Hong-mou-jins*—the "red-haired men,"—of whom they had often heard, but rarely if ever seen. We treated them with great kindness, and, I think, left a good impression upon their minds, which may be of use to future tourists in these mountains.

As we had now no more hills to cross, and as the road was good, we got into our mountain bamboo chairs and took our way down the glen towards the plains. The scenery in this glen is more strikingly beautiful than that in any part of the province which has come under my observation, and reminded me forcibly of what I had seen when crossing the Bohea Mountains. High hills rose on each side of us densely covered with the Japan cedar, weeping junipers, and pines; behind, our view was bounded by high mountains, while in front we got now and then glimpses of an extensive fertile plain, richly wooded near the base of the hills, in a high state of cultivation, and teeming with an industrious and happy people.

We arrived just before dark at Ning-kang-jou, a small town near one of the sources of the Ningpo river, where our boats were waiting us. Here we

found our old friend Mr. A-chang, who had reached the boats some few minutes before us. We invited him to dine with us again; and before he left us we presented him with an English umbrella, a pencil-case, and some few articles of foreign manufacture which we knew had taken his fancy, and with which he was highly delighted. With a kind invitation to visit him at his little temple, should we ever again come that way, he bade us a hearty farewell.

CHAPTER X.

Collections shipped for India — Success attending this year's importations — Visit Canton — Method of scenting teas described — Flowers used in the operation — Their scientific and Chinese names — Their relative value — Prices paid for them — Manufacture of "caper" described — Inferior ditto — "Lie capers" — Orange pekoe — High character of foreign merchants in China — Howqua's garden described — Its plants, ornamental doors, and alcoves, &c. — Polite notices to visitors worthy of imitation.

The various collections I had made during the summer and autumn had been left, from time to time as they were formed, in the charge of Chinese friends in various parts of the country. Mr. Meadows, of the British consulate in Ningpo, and Mr. Wadman, a merchant there, had also taken charge of some plants which I had planted for safety in their gardens. It was now of great importance to get all these collections together as speedily as possible, and have them conveyed to the port of Shanghae, where they could be packed in a proper manner and shipped to Hongkong, and from thence to India. This was satisfactorily accomplished, and, being luckily favoured with fine weather and a leading wind, I reached Shanghae in two days, and deposed my collections safely in the garden of Mr. Beale. A large number of Ward's cases, having been ordered some time be-

fore, were now ready. These were now filled with earth, and all the plants carefully planted; at the same time large quantities of tea-seed, chesnuts, and other things of that nature were sown in the soil and left to germinate on the voyage to India. My other collections of the seeds of useful and ornamental trees and shrubs were well dried and packed in a common wooden box.

It is very rare that there is a vessel from Shanghae direct for Calcutta, and consequently all these things had to be transshipped at Hongkong. Living plants are not like bales of merchandize; they are easily destroyed by the admission of salt water or salt air, and are more likely to be damaged while undergoing transshipment than during a long voyage at sea. As on former occasions, I determined to accompany my collections to Hongkong, and look after the transshipment myself. The formation of this collection had cost me much labour and care; the unsettled condition of the country rendered it extremely doubtful that I should be equally successful in the following season; and it was therefore an object of the first importance to endeavour by every means in my power to ensure the safety of that now in hand.

Everything went according to my wishes; Hongkong was reached in safety, the collections were sent on to Calcutta in four different ships, and a few months afterwards I had the very great satisfaction to hear that the whole had arrived at their destination in excellent condition. No fewer

than 23,892 tea-plants, upwards of 300 chesnut-trees, and a large quantity of other things of great value in India, now growing on the Himalayas, were the results of this year's labours. The rice-paper plant (*Aralia papyrifera*) presented to me by J. C. Bowring, Esq., of Hongkong, was also introduced to India, and is now a remarkable object of great interest in the Calcutta gardens.

When the various consignments had been despatched, I went up to Canton for a few days before proceeding again to the north, in order if possible to get some reliable information as to the mode of scenting tea, which is only understood and practised at this port with teas destined for the foreign markets. I had been making inquiries for some time past, both of foreigners and Chinese, about this curious process carried on so extensively at Canton; but the answers and descriptions I received to my questions were so unsatisfactory, that I gave up all hopes of understanding the process until I had an opportunity of seeing and judging for myself. When I reached Canton I was informed the whole process might be seen any day at that season in full operation in a tea-factory on the island of Honan. Messrs. Walkinshaw and Thorburn, two gentlemen well acquainted with the various kinds of teas sent annually to Europe and America, consented to accompany me to this factory, and we took with us the Chinese merchant to whom the place belonged. I was thus placed in a most favourable condition for obtaining a

correct knowledge of this most curious subject. When we entered the tea-factory a strange scene was presented to our view. The place was crowded with women and children, all busily engaged in picking the stalks and yellow or brown leaves out of the black tea. For this labour each was paid at the rate of six cash a catty, and earned on an average about sixty cash a day,—a sum equal to about threepence of our money. The scene altogether was not unlike that in the great Government Cigar Manufactory at Manilla. Men were employed giving out the tea in its rough state, and in receiving it again when picked. With each portion of tea a wooden ticket was also given, which ticket had to be returned along with the tea. In the northern tea-countries the leaves are carefully weighed when they are given out and when they are brought back, in order to check peculation, which is not unfrequent. I did not observe this precaution taken at Canton. Besides the men who were thus employed, there were many others busily at work, passing the tea through various sized sieves, in order to get out the caper, and to separate the various kinds. This was also partly done by a winnowing machine, similar in construction to that used by our farmers in England. Having taken a passing glance at all these objects on entering the building, I next directed my attention to the scenting process, which had been the main object of my visit,—and which I shall now endeavour to describe.

In a corner of the building there lay a large heap of orange-flowers, which filled the air with the most delicious perfume. A man was engaged in sifting them to get out the stamens and other smaller portions of the flower. This process was necessary, in order that the flowers might be readily sifted out of the tea after the scenting had been accomplished. The orange-flowers being fully expanded, the large petals were easily separated from the stamens and smaller ones. In 100 parts 70 per cent. were used and 30 thrown away. When the orange is used, its flowers must be fully expanded, in order to bring out the scent; but flowers of jasmine may be used in the bud, as they will expand and emit their fragrance during the time they are mixed with the tea. When the flowers had been sifted over in the manner described they were ready for use. In the mean time the tea to be scented had been carefully manipulated, and appeared perfectly dried and finished. At this stage of the process it is worthy of observing that, while the *tea was perfectly dry, the orange-flowers were just as they had been gathered from the trees.* Large quantities of the tea were now mixed up with the flowers, in the proportion of 40 lbs. of flowers to 100 lbs. of tea. This *dry tea* and the *undried flowers* were allowed to lie mixed together for the space of twenty-four hours. At the end of this time the flowers were sifted out of the tea, and by the repeated sifting and winnowing processes which the tea had afterwards to undergo

they were nearly all got rid of. Sometimes a few stray ones are left in the tea, and may be detected even after it arrives in England. A small portion of tea adheres to the moist flowers when they are sifted out, and this is generally given away to the poor, who pick it out with the hand.

The flowers, at this part of the process, had impregnated the tea-leaves with a large portion of their peculiar odours, but they had also left behind them a certain portion of moisture, which it was necessary to expel. This was done by placing the tea once more over slow charcoal-fires in baskets and sieves prepared for the purpose of drying. The scent communicated by the flowers is very slight for some time, but, like the fragrance peculiar to the tea-leaf itself, comes out after being packed for a week or two. Sometimes this scenting process is repeated when the odour is not considered sufficiently strong; and the head man in the factory informed me he sometimes scented twice with orange-flowers and once with the "Mo-le" (*Jasminum Sambac*).

The flowers of various plants are used in scenting by the Chinese, some of which are considered better than others, and some can be had at seasons when others are not procurable. I considered it of some importance to the elucidation of this subject to find out not only the Chinese names of these various plants, but also, by examining the plants themselves, to be able to give each the name by which it is known to scientific men in all

parts of the world. The following list was prepared with great care, and may be fully relied upon. The numbers prefixed express the relative value of each kind in the eyes of the Chinese, and the asterisks point out those which are mostly used for scenting teas for the foreign markets in the order in which they are valued ; thus the "Mo-le" and the "Sieu-hing" are considered the best, and so on :—

1. Rose, scented (Tsing moi-qui-hwa).
1 or 2. Plum, double (Moi-hwa).
2*. Jasminum Sambac (Mo-le-hwa).
2 or 3*. Jasminum paniculatum (Sieu-hing-hwa).
4*. Aglaia odorata (Lan-hwa, or Yu-chu-lan).
5. Olea fragrans (Kwei-hwa).
6*. Orange (Chang-hwa).
7*. Gardenia florida (Pak-sema-hwa).

It has been frequently stated that the *Chloranthus* is largely used. This appears to be a mistake, originating, no doubt, in the similarity of its Chinese name to that of *Aglaia odorata*. The *Chloranthus* is called "Chu-lan," the *Aglaia* "Lan" or "Yu-chu-lan."

The different flowers which I have just named are not all used in the same proportions. Thus, of orange-flowers there are 40 lbs. to 100 lbs. of tea ; of *Aglaia* there are 100 lbs. to 100 lbs. ; and of *Jasminum Sambac* there are 50 lbs. to 100 lbs. The flowers of the Sieu-hing (*Jasminum paniculatum*) are generally mixed with those of the Mo-le (*Jasminum Sambac*), in the proportion of 10 lbs. of the former to 30 lbs. of the latter, and the 40 lbs. thus produced are sufficient for 100 lbs.

of tea. The "Kweihwa" (*Olea fragrans*) is used chiefly in the northern districts as a scent for a rare and expensive kind of Hyson Pekoe—a tea which forms a most delicious and refreshing beverage when taken *à la Chinoise* without sugar and milk. The quantity of flowers used seemed to me to be very large; and I made particular inquiries as to whether the teas that are scented were mixed up with large quantities of unscented kinds. The Chinese unhesitatingly affirmed that such was not the case; but, notwithstanding their assertions, I had some doubt on this point.

The length of time which teas thus scented retain the scent is most remarkable. It varies, however, with the different sorts. Thus, the *Olea fragrans* tea will only keep well for one year; at the end of two years it has either become scentless, or has a peculiar oily odour which is disagreeable. Teas scented with orange-blossoms and with those of the Mo-le will keep well for two or three years, and the Sieu-hing kinds for three or four years. The Aglaia retains the scent longer than any, and is said to preserve well for five or six years. The tea scented with the Sieu-hing is said to be most esteemed by foreigners, although it is put down as second or third rate by the Chinese.

Scented teas for the foreign market are nearly all made in Canton, and are known to merchants by the names of "Scented Orange Pekoe," and "Scented Caper." They are grown in and near

a place called Tai-shan, in the Canton province. Mr. Walkinshaw informs me that other descriptions of tea, both black and green, have been scented for the English market, but have been found unsuitable. True "caper" is to black tea what the kinds called "imperial" and "gunpowder" are to green: it assumes a round, shot-looking form during the process of manipulation, and it is easily separated from the other leaves by sifting or by the winnowing machine. It is a common error to suppose that "imperial" or "gunpowder" amongst green teas, or "caper" amongst black ones, is prepared by rolling each leaf singly by the hand. Such a method of manipulation would make them much more expensive than they are. One gathering of tea is said to yield 70 per cent. of orange pekoe, 25 of souchong, and 5 of caper. The quantity of true caper would therefore appear to be very small; but there are many ways of increasing the quantity by peculiar modes of manipulation, as I shall afterwards show.

In a large factory, such as this at Canton, there is, of course, a considerable quantity of dust and refuse tea remaining after the orange pekoe, caper, and souchong have been sifted out of it. This is sold in the country to the natives at a low price, and no doubt is often made up with paste and other ingredients into those *lie teas* which now-a-days find a market in England. Nothing is lost or thrown away in China. The stalks and yellow leaves which have been picked out by women and

children are sold in the country; while the flowers which have done their duty in the scenting process are given to the poor, who pick out the few remaining tea-leaves which had been left by the sieve or winnowing machine. Some flowers, such as those of the Aglaia for example, after being sifted out from the tea are dried and used in the manufacture of the fragrant "joss-stick," so much used in the religious ceremonies of the country.

It appears from these investigations that many kinds of fragrant flowers besides those used by the Chinese would answer the purpose equally well, and therefore in places like India, where tea is likely to be produced upon an extensive scale, experiments in scenting might be made with any kinds of fragrant jasmines, daphnes, aurantiaceous or other plants of a like kind indigenous to the country.

It will be observed from the description just given that the method of scenting teas, like most of the arts in China, is exceedingly simple in its nature and most efficient. It used to be said by those who knew nothing about the matter, that "the flowers were put over a slow fire, with the tea in a separate basket above them, and so the fire drove the scent from the flowers into the tea"! Knowing the immense capacity which *dry* tea has for moisture of any kind, how much more simple and beautiful is the process of allowing it to lie for a space of time mixed up with *undried* flowers!

A few years ago I published a description of the Chinese mode of dyeing green teas to suit our depraved tastes in Europe, and particularly in America, where they are largely consumed. Scenting teas is a very different thing, and nothing can be urged against the taste for them. That this is so in the eyes of the Chinese may be gathered from the fact that, while they *dye* their teas, not to drink, but only to *sell*, they consume and highly appreciate these scented ones.

The price paid for flowers used in the scenting process varies, like everything else, according to the demand or supply in the market. In 1854 and 1855 it was about seventeen dollars per pecul,* but sometimes as much as thirty dollars are paid for the same quantity. In former years—ten or twelve years ago—as much as sixty dollars per pecul used to be paid for flowers. This information was given me some time after I had been examining the method of scenting in the Honan factory, and by another manufacturer, and confirmed me in the opinion I had then formed, namely, that after the tea is once scented with the proportions of flowers mentioned above, it is mixed up with large quantities of unscented tea. Were this not so, the large quantity of flowers used would render the tea much more expensive than it really is. Upon making further inquiries, of different individuals and at different times, I found that my surmises were correct. The results

* 133⅓ lbs.

of the information thus obtained were, that sixty pounds of this highly-scented mixture were capable of scenting one hundred pounds of unscented tea, and no doubt it is sometimes used in even smaller proportions.

In all investigations of this nature one is very apt to be misled by the Chinese; not, perhaps, so much intentionally as from ignorance or carelessness as to whether the information given be correct or otherwise. And having once made an assertion, a Chinese does not like to confess himself mistaken or in the wrong; but this propensity is not confined to the inhabitants of the Celestial Empire. Unless one sees a process with his own eyes, he must in all cases use some discretion when he has to take his information at second hand. With ordinary care, however, and a little common sense, the truth may generally be arrived at, even from the Chinese.

Having satisfied myself as to the mode of scenting teas, I was now anxious to know how the kinds called "Caper" and "Orange Pekoe" are manufactured, as they are quite different in appearance from teas made in the great black-tea provinces of Fokien and Kiang-si. As large quantities of these teas—indeed, the whole which are exported—are made up near Canton, it was not difficult to find out where some of the factories were situated, or to gain admission to witness the process. M. C. Morrison, Esq., her Majesty's Vice-Consul at Canton, whose knowledge of the Chi-

nese language is of a very high order, having expressed a wish to accompany me, we set out together, with a Chinese merchant for our guide. Our guide told us that the manufacture, which was very extensive, was carried on in a great many parts of the suburbs of Canton; but that the most extensive and best hongs were situated on the island of Honan already mentioned. We crossed the main river in a boat, and then pulled up a canal for a short distance which led through a densely populated suburb. Here we soon found ourselves abreast of a number of large tea-hongs, which our guide informed us were those to which we were bound. These hongs were large and spacious buildings of two stories. The lower portion was filled with tea and implements of

Tea Picker. Canton.

manipulation, while the upper was crowded with hundreds of women and children engaged in picking and sorting the various sorts.

On entering one of these hongs or factories, the first thing to which we directed our attention was the tea which was to be made into "caper." I have already stated that this description of tea is produced near a place called Tai-shan, in the Canton province, a few miles inland from the city. Here it undergoes only the first process of manipulation; that is, it is fired, rolled, and dried, and the colour fixed, but nothing further is done to it. It is then packed up in mat-bags or baskets and sent down to Canton to be made up in the approved manner, and scented for exportation. On examining the tea it presented a very rough appearance, and in the state in which it was, seemed unsuited for the foreign markets. The workmen were busily engaged in remaking it during the time of our visit, and they went to work in the following manner:—

A convenient quantity—about twenty or thirty pounds—was thrown into the drying-pan, which had been heated for the operation. Here it was sprinkled with a basinful of water, and rapidly turned over with the hands of the workman. The dry leaves immediately imbibed the moisture, and became soft and pliable. This softening process prevented them from breaking down into dust, and fitted them, also, to take any form which was considered desirable by the manipulator. The

water used on this occasion stood in a large basin adjoining the drying-pans, and had a yellow, dirty appearance, which I was rather at a loss to account for. At first sight I thought it was mixed with some ingredient which was intended to give a peculiar tint or colour to the tea; but on inquiry it turned out that my conjecture was wrong. Our guide, on being appealed to for information on the subject, coolly informed us that "there was nothing in the water, it was quite clean, but that the workmen were in the habit of washing their hands in it!"

As soon as the leaves had become softened by the moisture and heat in the pan, they were taken out and put into a strong canvas bag, and twisted firmly into a round form, resembling a football. This bag was then thrown down on the floor, which had been covered with a mat, and a man jumped upon it with both feet, supporting himself at the same time by laying hold of a bamboo pole, which had been erected in a horizontal position for the purpose. The heel, sole, and toes of his feet were now kept in perpetual motion in turning and twisting the ball, while the weight of his body compressed it gradually into a smaller size. As the bulk of the ball is thus reduced by pressure, the canvas slackens, and it is necessary for the workman from time to time to jump off it and tighten its mouth by giving it an extra twist with his hands. The balls by this process of rolling and twisting become at last

very hard and solid, and are then thrown on one side, and allowed to lie in this state for several hours: if this work has been done in the evening, they remain all night. By this system of pressing, twisting, and rolling, the greater portion of the moist leaves take a circular form, which goes on to perfection during the subsequent drying which the leaves have, of course, to undergo, and ends in the production of the round shot-like appearance by which this kind of tea is known.

It is a most curious sight to a stranger who sees the mode of making this tea for the first time. A whole row of these men, nearly naked when the weather is warm, each with a large ball under his feet, which he is twisting and rolling with all his might, is so unexpected a sight in tea-making. The clever sketch (*Frontispiece*) by my friend Mr. Scarth gives a good idea of this curious process.

The best kind of "caper" takes the round form naturally during the manufacture of souchong or congou; but, as I have already mentioned, only a very small quantity—about five per cent.—could be procured in this way. By far the greatest portion of the caper exported is manufactured in the manner I have just described.

But as I am letting out all the secrets of tea-manufacture, I may just as well notice another mode of making "caper," which is scarcely as legitimate as the former. In one corner of the factory we observed a quantity of tea, exceedingly coarse in quality,—in fact, the refuse of that which

we had been examining. All the art of the manipulator, in so far as heating, and pressing, and rolling in the usual way, was not equal to make a good-looking "caper" out of this. The leaves were too old, too large and coarse in their present state. But, although there might be some difficulty, even to a Chinese, in making small leaves into large ones, there was none whatever in making large leaves small; and their mode of doing this was as follows:—These coarse leaves were first of all heated and moistened as the others had been, in order to make them soft and pliable. They were then thrown into square boxes and chopped up for some time, until the size of the leaves was reduced. When this was accomplished to the satisfaction of the operator, they were then made into nice-looking round "caper," suitable for the market.

The origin of the name this tea bears is, no doubt, derived from its resemblance in form to the flower-buds of the caper-bush of the south of Europe. And yet it is rather a curious coincidence that the greater part of *caper* tea finds its market in the *Cape* of Good Hope.

It will probably suggest itself to the reader who has paid any attention to tea-making that large quantities of those kinds of green tea known as "gunpowder" and "imperial" may be manufactured in the same way as "caper," and this is, no doubt, the case, particularly about Canton. And further, it is the simplest thing in the world to

convert "caper" into "imperial" and "gunpowder," and this, too, is often done. Our Chinese guide informed us, with a peculiar grin on his countenance, that, when there is a large demand for green teas, "caper" is converted into "imperial" and "gunpowder" by dyeing it with Prussian blue and gypsum!

The "orange pekoe" of commerce, which is produced in the same district as the "caper," is somewhat like congou in make, but the leaf is much more wiry and twisted, and is of a lighter complexion. The infusion produced by this tea has a yellow or orange tint, and hence the name of orange pekoe which it bears. Like hyson pekoe amongst green teas, this is made from the young leaves soon after they unfold themselves in spring, and hence many of the leaves are covered with white hairs which are formed at this season of the year. These hairy leaves are called "pekoe ends" by the trade. A large quantity of this tea is gathered and dried by itself, while another portion is taken out of that of which the "caper" is ultimately made.

Canton enjoys the unenviable notoriety of manufacturing what are commonly called "lie teas" or "lie capers." These are made out of tea-dust mixed with other rubbish, and which is taken up and held together by a glutinous substance consisting of rice and water. Thin showers of this substance are thrown over the layers of dust, and, as each little globule of the fluid comes in contact with it,

a certain number of particles adhere, and in the course of time are made into little round balls resembling the caper of commerce. But no one is, or ought to be, deceived by this. Small quantities of such teas are, no doubt, exported, but it must be with the knowledge and connivance of the foreigner himself, whom I shall not honour with the title of foreign merchant. And I shall be greatly surprised to find that such a clumsy fraud affects the respectable broker or dealer in Europe or America.

During a late tour in India I was told on more than one occasion, on the authority of "Old Indians" who had been home, that it was next to impossible to get genuine tea in England, now that the East India Company had no control over the China trade; and that since the demand had so much increased, the Chinese were in the habit of supplying it by substituting the leaves of other trees and shrubs for that which is genuine.

This idea is simply absurd: as a general rule the Chinese are doing no such thing; they have plenty of true tea in the country to supply all demands, were they twice as great as they are. And while it may be perfectly true that some unprincipled adventurers encourage the production of "lie teas" by buying them up, the great bulk of the teas exported are unadulterated with other articles. If sloe-leaves and beech-leaves, and other articles of that kind, are found in the tea-pot by the consumer, they are much more likely

to have been manufactured in England than in China.

The foreign merchants in China as a class are upright and honourable men, and quite incapable of lending themselves to frauds of this description. Besides, every house of any standing has a "tea-taster" who has a perfect knowledge of his business, and who can not only tell true tea from false, but, in most instances, can tell the identical district in which the sample presented to him has been produced.

As it seems only a step or two from the well-known "Howqua's Mixture" to the less known Howqua's Garden, I now ask the reader to visit that with me before we leave Canton.

This garden is situated near the well-known Fa-tee nurseries, a few miles above the city of Canton, and is a place of favourite resort both for Chinese and foreigners who reside in the neighbourhood, or who visit this part of the Celestial Empire. I determined on paying it a visit in company with Mr. M'Donald, who is well known in this part of the world as an excellent Chinese scholar, and to whom I am indebted for some translations of Chinese notices, which appeared very amusing to us at the time, and which, I dare say, will amuse my readers.

Having reached the door of the garden, we presented the card with which we were provided, and were immediately admitted. The view from the entrance is rather pleasing, and particularly

striking to a stranger who sees it for the first time. Looking "right ahead," as sailors say, there is a long and narrow paved walk lined on each side with plants in pots. This view is broken, and apparently lengthened, by means of an octagon arch which is thrown across, and beyond that a kind of alcove covers the pathway. Running parallel with the walk, and on each side behind the plants, are low walls of ornamental brickwork, latticed so that the ponds or small lakes which are on each side can be seen. Altogether the octagon arch, the alcove, the pretty ornamental flower-pots, and the water on each side, has a striking effect, and is thoroughly Chinese.

The plants consist of good specimens of southern Chinese things, all well known in England, such, for example, as Cymbidium sinense, Olea fragrans, oranges, roses, camellias, magnolias, &c., and, of course, a multitude of dwarf trees, without which no Chinese garden would be considered complete. In the alcove alluded to there are some nice stone seats, which look cool in a climate like that of southern China. The floor of this building is raised a few feet above the ground-level, so that the visitor gets a good view of the water and other objects of interest in the garden. That this is a favourite lounge and smoking-place with the Chinese, the following Chinese notice, which we found on one of the pillars, will testify:—"*A careful and earnest notice:* This garden earnestly

requests that visitors will spit betle* outside the railing, and knock the ashes of pipes also outside." Several fine fruit-trees and others are growing near the walks, and afford shade from the rays of the sun. On one of these we read the following:—"Ramblers here *will be excused* plucking the fruit on this tree." How exceedingly polite!

Near the centre of the garden stands a substantial summer-house, or hall, named "the Hall of Fragrant Plants." The same notice to smokers and chewers of betle-nut is also put up here; and there is another and a longer one which I must not forget to quote. It is this:—"In this garden the plants are intended to delight the eyes of all visitors: a great deal has been expended in planting and in keeping in order, and the garden is now beginning to yield some return. Those who come here to saunter about are earnestly prayed not to pluck the fruit or flowers, in order that the beauty of the place may be preserved." And then follows a piece of true Chinese politeness—"We beg persons who understand this notice to excuse it!" Passing through the Hall of Fragrant Plants we approached, between two rows of Olea fragrans, a fine ornamental suite of rooms tastefully furnished and decorated, in which visitors are received and entertained. An inscription informs us that this is called "the Fragrant Hall of the Woo-che tree." Leaving this place by a

* Betle-nut is much used by the southern Chinese.

narrow door, we observed the following notice—"Saunterers here will be excused entering." This apparently leads to the private apartments of the family. In this side of the garden there is some fine artificial rockwork, which the Chinese know well how to construct, and various summer-houses tastefully decorated, one of which is called the "Library of Verdant Purity." Between this part of the garden and the straight walk already noticed there is a small pond or lake for fish and water-lilies. This is crossed by a zigzag wooden bridge of many arches, which looked rather dilapidated. A very necessary notice was put up here informing "saunterers to stop their steps in case of accident."

On the outskirts of the garden we observed the potting sheds, a nursery for rearing young plants and seeds, and the kitchen garden. Here a natural curiosity was pointed out by one of the Chinese, which, at first sight, appeared singularly curious. Three trees were growing in a row, and at about twenty or thirty feet from the ground the two outer ones had sent out shoots, and fairly united themselves with the centre one. When I mention that the outer trees are the Chinese banyan (Ficus nitida), it will readily be seen how the appearance they presented was produced. The long roots sent down by this species had lovingly embraced the centre tree, and appeared at first sight to have really grafted themselves upon it.

I am afraid I have given a very imperfect description of this curious garden. Those who know

what a Chinese garden is will understand me well enough, but it is really difficult to give a stranger an idea of the Chinese style which I have been endeavouring to describe. In order to understand the Chinese style of gardening it is necessary to dispel from the mind all ideas of fine lawns, broad walks, and extensive views; and to picture in their stead everything on a small scale—that is, narrow paved walks, dwarf walls in all directions, with lattice-work or ornamental openings in them, in order to give views of the scenery beyond; halls, summer-houses, and alcoves, ponds or small lakes with zigzag walks over them—in short, an endeavour to make small things appear large, and large things small, and everything Chinese. There are some of these ornaments, however, which I think might be imitated with advantage in our own gardens. Some of the doorways and openings in walls seemed extremely pretty. In particular I may notice a wall about ten feet high, having a number of open compartments filled with porcelain rods made to imitate the stems of the bamboo. I shall now close this notice with the modest lines of the Chinese poet, which we found written in the "Library of Verdant Purity," and which seemed to be an effort to describe the nature of the garden :—

> "Some few stems of bamboo-plants
> A cottage growing round;
> A few flowers here—some old trees there,
> And a mow * of garden ground."

* A mow is about the sixth part of an acre.

CHAPTER XI.

Visit the port of Foo-chow-foo — Its foreign trade — The advantages and disadvantages of the port — Steamer "Confucius" — Sail for Formosa — An amateur watch kept — Sea-sickness of mandarins — Appearance of Formosa from sea — Land on the island — Rice-paper plant — The natives — Productions of the island — Suggestions to the navy in these seas — Sail for Shanghae — Spring and spring flowers.

In the beginning of March, 1854, having completed my shipments and investigations in the south, I engaged a passage in a schooner and sailed for the port of Foo-chow-foo, the capital city of the province of Fokien, on my way to the more northerly ports of Shanghae and Ningpo. My objects in taking Foo-chow-foo by the way were two-fold. In the first place, I was anxious to make arrangements for getting a large supply of tea-seeds from the best black-tea districts about Woo-e-shan, in the autumn, when they would be ripe; and secondly, I determined to try and procure some black-tea manufacturers from the same districts, through the agency of some influential friends at this port. The great American house of Messrs. Russell and Co., by means of energy and large capital, had opened up a connexion with these districts the year before, and had shipped extensively direct from the river Min to America

the same description of black teas which formerly were carried overland across the Bohea mountains to Shanghae and to Canton. Mr. Cunningham, the head of that house at Shanghae, had promised me his assistance in the kindest manner, and Mr. D. O. Clark, who was conducting the business at Foo-chow, also entered warmly into my views on my arrival.

From the opening of Foo-chow in 1843 to the period mentioned, no foreign trade of any importance had been carried on at this port. Several merchants had tried it during these ten years; but as they were men of limited means—not being able to send funds into the country to purchase teas from the manufacturers—their exertions were not attended with success. When the rebels began to disturb and overrun the southern and central districts of the country, and when it seemed doubtful whether the tea-merchants would be able to bring their teas to Canton and Shanghae as formerly, Messrs. Russell and Co., with a clear-sightedness which does them the highest credit, foresaw that, owing to the power of the Government at Foo-chow, that port was likely to remain longer open than any of the others; and as it was no great distance from one great black-tea country—a country which during the days of the East India Company's charter produced the finest teas exported—they determined to make a vigorous effort to open up the trade. Having Chinese on their establishment whom they could

thoroughly trust, these men were intrusted with a large amount of capital, and sent inland to the tea country during the manufacturing season, in order to buy up such teas as they required, and transmit their purchases down the river Min to Foo-chow-foo. In the mean time vessels were chartered to go to the same port to load with such teas and convey them to their destination.

The system thus planned and carried out met with the most complete success, and I believe Messrs. Russell and Co. reaped the reward to which they were most justly entitled. Other large houses of capital soon followed the example which had been set them, and now a very large export trade in black teas is carried on at Foo-chow-foo. This is one good result which has arisen out of the rebellion in China, although perhaps it would be difficult to mention another. Had there been no anticipated difficulty in getting down teas to Shanghae and Canton, it is scarcely likely the idea of opening Foo-chow would have occurred to Messrs. Russell and Co.

But it is doubtful if the advantages of the Foo-chow trade are as great as they would seem to be at first sight. No doubt all teas made in the Fokien district, south of the Bohea mountains, and near the source and course of the river Min, can be brought more easily and more cheaply to Foo-chow than to any other port. And moreover, as they come nearly the whole way by water, the chests may be expected to arrive in better order

than when they have to be carried for many miles over mountains on the backs of coolies. And further, the new teas will always arrive very early, if this is an advantage.

These circumstances will no doubt be perfectly understood by merchants, and it is for them to say whether the disadvantages which I shall now notice are worth taking into consideration.

1st. The extensive sandbanks at the mouth of the Min, and the rapid currents in the river itself, have been urged by some as fatal objections to its safe navigation. In support of this view it is stated that since the opening of the trade several vessels and cargoes of great value have been completely lost, and insurance offices have been obliged to raise their rates of insurance.

At first sight this seems a very grave objection; but were it worth the merchant's while to conduct a large trade at Foo-chow, the dangers in navigation might be, if not removed entirely, rendered much less than they are, by means of permanent landmarks, buoys, &c. Besides small tug steamers would spring up, whose masters would soon gain a knowledge of the different passages, tides, and currents, and be able to take vessels out to or in from sea, in the most perfect safety. It is a disadvantage, no doubt, to have sandbanks, narrow passages, and rapid currents, but in this instance it does not seem to be insuperable.

2nd. The port of Foo-chow, although nearer to a black-tea district than any of the others open to

foreigners, is only nearer to *one district*—that which I have already noticed as being on the south side of the great Bohea mountain-range. The fine districts in Kiang-se, where the Monings or Ningchow kinds are produced, are all on the northern side of these mountains, and could be taken more readily south to Canton, over the Meling Pass, or north to Shanghae. In taking them to the latter place, the whole journey, except about twenty miles, is by water. What are called Hoo-pak and Hoonan teas can be brought down the Yang-tse-kiang all the way to Shanghae. And finally, with regard to tea, all the green-tea districts are much more accessible from Shanghae than from Foo-chow-foo.

3rd. The country lying between the sea and the great mountain-range in Fokien, in so far as is at present known, has no other articles of export except tea for which there is a demand in Europe and America.

4th. The river Min has its source amongst rugged and barren mountains, thinly populated: it does not lead into the heart of the empire; and hence it is doubtful if ever there will be an extensive market for foreign goods, such as there is at Shanghae or Canton.

Supposing therefore that it is possible to render the navigation of the Min comparatively safe, it appears that the port of Foo-chow has the advantage of being nearer one black-tea district than any of the other ports in China open to foreign

trade. But the other kinds of black tea, and *all* the green ones, can be taken more readily and cheaply to other ports. These other ports have the advantage of other articles of export besides tea. Shanghae, for example, is on the borders of the great Hoo-chow silk country. And lastly, vessels will have to come empty to the Min, owing to the want of a market for imports, while they can go deeply laden, to such ports as Canton and Shanghae, with the manufactures of the west, which can be exchanged for the silk and tea of China. No doubt in the course of time arrangements can be made with the Chinese merchants to receive foreign goods at certain rates at such places as Shanghae, and to pay for such goods in tea, to be delivered at Foo-chow; and in this case there is only the disadvantage of an empty vessel having to be sent to that port.

The advantages and disadvantages of Foo-chow as a great port of trade have thus been fairly stated from an intimate knowledge of the country and its productions, and the merchant is left to draw his own conclusions. My own impression is that it has been rather overrated within the last year or two; that it is absurd to compare it with Shanghae as a commercial emporium, as some have done; but that, owing to there being some large and populous cities on the banks of the Min, such as Foo-chow itself, which is supposed to contain nearly half a million of inhabitants, Yen-pin-foo, Kein-ning-foo, &c., a considerable trade may

ultimately be done in imports for the supply of these places. And teas from the south side of the Bohea mountains can always be brought cheaper, in better condition, and earlier in the season, to Foo-chow, than they can be had at any of the other ports.

Having completed the arrangement alluded to at the commencement of this chapter, I was anxious to proceed northward to Chekiang and Kiangnan. On making inquiries as to vessels for the northern ports, I found there was nothing of the kind in port except native craft—boats and wood junks—which were very unsafe, owing to the hordes of pirates which infested all parts of the coast. Owing to the unsettled state of the country and the weakness of Government at this time, it would have been an act of madness to have trusted myself in any of these vessels, unless I had been tired of my life, or had had an inclination to spend some months as a prisoner on some piratical island. As I was not weary of life, and had no fancy for the alternative of being imprisoned with thieves and robbers for my companions, I determined not to go to sea in a native vessel. I was strongly urged to this course by all the foreigners in Foo-chow, but they looked to me like "Job's comforters," for one and all were of opinion that it would be necessary for me to return again to Hongkong—a distance of some four hundred miles, which I had just beat up against the monsoon—before I would be able to get a vessel bound

for the northern ports. My lucky star, however, happened to be in the ascendant. One fine morning a Portuguese lorcha came into port, bound north to Ningpo, convoying a number of junks to protect them from pirates. As this vessel was heavily armed, I determined to trust myself in her, and had gone on board to look at her accommodations, and to make arrangements about my passage-money.

"It never rains but it pours," says the proverb, which I cannot help thinking is a gross calumny, particularly on those soft spring showers which were at this time (April) falling on the east coast of China. The proverb proved true, however, in a figurative sense, in this instance, for, before I had made arrangements for a passage in the lorcha, the American steamer "Confucius" made her appearance from Shanghae, and soon came to an anchor amongst the Chinese junks a little below the town. As I suspected the steamer might have been chartered by Messrs. Russell and Co. in Shanghae, to carry some important news, I felt some diffidence in making any inquiries as to her destination. My friend Mr. Clark, however, who knew how anxious I was to get north, mentioned the circumstance to Captain Dearborn, and that gentleman most kindly came forward and offered me a passage without its having been asked. In the mean time, as there were numerous pirates on the coast, of whom the mandarins themselves were afraid, the Government chartered the

steamer to convey money across to the island of Formosa, where a rebellion was going on, and where it was necessary to have money to carry on the war. I had thus an opportunity of paying a short visit to this beautiful and interesting island.

When we had taken the boxes of money on board with a guard of mandarins and soldiers, we got up our anchor and steamed down to the mouth of the Min. Our decks were covered with Chinese soldiers, and their baggage, consisting of baskets and trunks of clothes, arms of various kinds, such as bows and arrows, short swords, matchlocks, and bamboo shields; while mixed up with these in wild confusion were beds and mandarins' hats, with crystal and white buttons; there were also various eatables, such as sugar-cane, &c., which the soldiers intended to consume during the voyage. Altogether, the scene thus presented was a striking one, and one which gave an idea of Chinese warlike life, not often presented to the eye of a foreigner.

When we arrived at the mouth of the Min we anchored for the night, as it was then too late to cross the sandbanks at the entrance. The coast here was swarming with pirates, both on land and at sea; and although on ordinary occasions a foreign vessel, and particularly a "fire-ship," * would have been safe enough, yet loaded as we were with boxes of sycee silver, the temptation to these lawless bands was stronger than usual, and

* The name given to steamers by the Chinese.

rendered an attack far from unlikely. And had such an attack been made by two or three hundred men, armed with stinkpots and other combustibles, which they generally commence with in cases of this nature, the steamer and all its valuable cargo would have been an easy prize, owing to the small number of foreigners on board. If it ever happen that our mandarin passengers, or any of their *brave* soldiers who were on board at this time, should peruse these lines, I have to beg their pardon, with many low bows, for not taking their valour into consideration.

In addition to the captain, the engineer, and two or three officers belonging to the steamer, there were several passengers on board who had come down from Shanghae for the purpose of seeing the city of Foo-chow. Captain Dearborn very properly proposed that we should all take a share in the protection of the vessel, and that the best way to prevent an attack was to be prepared for one. The Chinese pirate is somewhat like a tiger in his habits, in so far as foreigners at least are concerned. He knows they will fight and defend themselves—he has had several good lessons on this score—and he will rarely attack them if he sees them prepared; but if he can catch them asleep, or take them unawares, he will leap upon them at once, and murder all who show the least resistance.

Knowing these things well, the passengers readily acceded to the proposal which had been

made by the captain. The night from eight P.M. to four next morning was divided into four watches of two hours each, and as we numbered in all about eight or nine persons, there was enough to have two for each watch. The hours were now written out on small slips of paper, and thrown into a hat to be drawn for in the usual way.

When eight bells were struck, Captain Dearborn and Mr. Sturges, who were lucky enough to draw from eight to ten, mounted guard, and marched up and down the deck, armed with a pistol, cutlass, and matchlock, and ready to repel boarders and give any alarm if it was necessary. I was unlucky enough to draw the sleepy watch from twelve to two. We reported four bells to the chief officer, struck the intermediate hours, and sung out "all's well" in the most approved and seamanlike manner. Once or twice during the night it was necessary to warn boats to keep off when it was thought they were coming too near, but nothing occurred to create any alarm. Soon after four o'clock Mr. Floud, the engineer, commenced getting his steam up, and the steam-pipe began hissing and snorting and bidding defiance to pirates, however numerous or however bold.

Leaving the mouth of the river at daylight, we stood out to sea across the channel in the direction of the north-west end of Formosa, to which we were bound. The distance across the channel here is rather more than 100 miles; and as a stiff breeze was blowing from the north and a heavy

sea on, our brave Chinese soldiers were doomed to suffer severely from sea-sickness. Huddled about the decks in every direction, unable to move or to eat, and perfectly indifferent to everybody and everything, they presented a most forlorn and wretched appearance. One old mandarin in particular happened to suffer more than any of the others. He was a stout, fat man, rather red in the face, and evidently accustomed to good living on shore. When we started, he was down in the cabin with the others, laughing and joking in the best of spirits; but as soon as we crossed the bar and felt a little motion, he began to put on a most serious countenance, and was evidently most uneasy. At last he could stand it no longer, and rushed up the cabin stairs to the deck. Every now and then we heard a loud groan, which told too plainly of the poor man's sufferings,—sufferings, too, for which no one seemed to have any compassion. The next time I saw him he made a faint attempt to smile, but it ended in a kind of shudder as he rushed past me to the side of the vessel. I confess I pitied the poor fellow, and recommended him to have his bed on deck and to lie down. He took my advice and lay down amongst his retinue, many of whom were nearly as bad as himself,—all distinction for the time being set aside, as they lay on the wet deck of the steamer, with the spray from the ocean dashing over them.

In the afternoon, shortly after we had lost sight

of the shores of China, the high mountains of Formosa came into view. When seen from this position out at sea, the height of the mountains seems greater than that of those in the vicinity of Foo-chow-foo. Judging from the height of mountains well known, I imagine those now in view may be from 3000 to 4000 feet above the level of the sea. Some others in the interior of the island are said to be as high as 10,000 feet, but these did not come under our observation. Night came on as we neared the land, and we were told by the pilot that we must anchor until daylight, as he could not undertake to go in during the dark. In the mean time, the wind had died away, the sea was smooth, and all our Chinese friends, the old mandarin included, were on their legs and in the highest spirits, seemingly astonished at the rapidity with which we had crossed the channel.

Next morning at daylight we entered a river which leads up to an important town called Tamshuy, and dropped our anchor abreast of a small town near its mouth, amongst numerous other junks and small boats which seemed to be trading between China and Formosa. As soon as we had anchored, the mandarins sent their cards to the officials on shore, and soon afterwards left the vessel themselves, promising to return again to make arrangements for landing the treasure.

As this was my first visit to this fine island, and as I knew we had only a short time to stay, I lost no time in going on shore. Before leaving the

vessel I had been examining with a spy-glass some large white flowers which grew on the banks and on the hill-sides, and I now went in that direction, in order to ascertain what they were. When I reached the spot where they were growing, they proved to be very fine specimens of Lilium japonicum—the largest and most vigorous I had ever seen. As I was admiring these beautiful lilies, which were growing as wild as the primroses in our woods in England, another plant of far more interest caught my eye. This was nothing less than the rice-paper plant—the species which produced the far-famed rice-paper of China, named by Sir W. Hooker *Aralia papyrifera*. It was growing apparently wild; but the site may have been an old plantation, which was now overgrown with weeds and brushwood. The largest specimens which came under my notice were about five or six feet in height, and from six to eight inches in circumference at the base, but nearly of an equal thickness all up the stem. The stems, usually bare all the way up, were crowned at the top with a number of noble-looking palmate leaves, on long footstalks, which gave to the plant a very ornamental appearance. The under side of each leaf, its footstalk, and the top part of the stem, which was clasped by these stalks, was densely covered with down of a rich brown colour, which readily came off upon any substance with which it came in contact. I did not meet with any plant in flower during my rambles, but it is probable the

plant flowers at a later period of the year.* Numerous small plants were coming through the ground in various directions, which a Chinese soldier carefully dug up for me, and which I took with me to Shanghae, and deposited them in Mr. Beale's garden. These, with a few samples of the largest stems I could find, have been sent to England and India; the latter will prove an interesting addition to our museums of vegetable productions. The proportion of pith in these stems is very great, particularly near the top of vigorous growing ones, and it is from this pure white substance that the beautiful article erroneously called "rice-paper" is prepared.

The Chinese call this plant the *Tung-tsaou*. What it was, or to what part of the vegetable kingdom it belonged, was long a mystery to botanists, who were oftentimes sadly misled by imaginary Chinese drawings, as some of those which have been published will clearly show, now that our knowledge has increased. Indeed the only drawing I have seen in Europe, which has any claim to be considered authentic, is that brought from China by the late Mr. Reeves many years ago, and which I have seen in the library of the Horticultural Society of London.

The *Tung-tsaou* is largely cultivated in many parts of the island of Formosa, and with rice and camphor forms one of the chief articles of

* It flowers and seeds during the winter and spring months at Hong-kong and Calcutta.

export. Mr. Bowring, who read a paper upon the rice-paper plant, before the China branch of the Royal Asiatic Society, informs us that the Canton and Fokien provinces are the chief consumers, and that the town of Foo-chow alone is supposed to take annually not less than 30,000 dollars worth of this curious and beautiful production. The cheapness of this paper in the Chinese market, as Mr. Bowring justly remarks, is evidence of the abundance of the plant in its place of growth, and more especially of the cheapness of labour. "That 100 sheets of this material (each about three inches square), certainly one of the most beautiful and delicate substances with which we are acquainted, should be procurable for the small sum of 1¼*d.* or 1½*d.*, is truly astonishing; and when once the attention of foreigners is directed to it, it will doubtless be in considerable request among workers in artificial flowers in Europe and America, being admirably adapted to their wants." The larger sheets, such as those used by the Canton flower-painters, are sold for about 1½*d.* each.

If the Tung-tsaou proves hardy in England, its fine foliage will render it a favourite amongst ornamental plants in our gardens. Judging, however, from its appearance when growing on its native island, and from the temperature of Formosa, I fear we cannot expect it to be more than a greenhouse plant with us.

Before I left China it had been completely naturalised on the island of Hong-kong. A noble

plant was growing in the garden at head-quarters house, several very fine ones were observed in Messrs. Jardine's garden at East-point to which Mr. Bowring had introduced it, and younger plants were seen springing up in all directions.

It is really a most striking-looking plant, and highly ornamental. At all times the fine, broad palmate leaves which crown the stem have a noble appearance, and in the winter months its large panicles of flowers make it more interesting.

In going on shore I had landed near an old fort, like many others in China in a most ruinous condition, but still mounting a few old rusty cannon which seemed more for show than for use. The houses of the soldiers inside the fort were, with one or two exceptions, in ruins, and the men told me they had received no pay for a length of time. This was, no doubt, the case over all the island, and was probably the cause of the rebellion which had now broken out in various parts of the country, and which the money we took over was sent to quell.

Leaving the fort and its poverty-stricken guards, I went on to the town, or rather large village, which seems to be the seaport of Tam-shuy. Here I found the authorities receiving those mandarins who had been our fellow-passengers, and giving each a salute of three guns on landing. Some tradesmen were busily employed in fitting up a theatre in which a play was to be performed in the afternoon, also in honour of the new arrivals, and

to which we were invited. The houses in the town were generally poor and mean-looking, and there seemed nothing in the shops except the simplest articles of food, such as fish, pork, sweet potatoes and various other vegetables in daily use among the population. However, as I have already remarked, this is only an insignificant seaport, and gives no idea of the more wealthy towns, which are known to exist inland.

As several vessels, which have been shipwrecked at different times on the coast of Formosa, have had their crews barbarously treated by the natives, the impression is abroad that it is far from being safe to land on any part of the island. Judging, however, from the short acquaintance I had with the people, I am inclined to believe the impression to be unfounded; unless, indeed, in cases of shipwreck, when they may not be trusted. But this is the same in China,—and, perhaps, we might instance other places nearer home. Everywhere, both in the town and also in the country, I was civilly and even kindly received by the people. They begged me to enter their houses and sit down, and invariably set tea before me and offered me anything they had in use amongst themselves, —and, during a day's excursion, I did not hear a single disrespectful word from any of those with whom I came in contact.

The natives of Formosa are Chinese, and are under the control of the Governor of Fokien, whose head-quarters are in the city of Foo-chow-

foo, on the river Min. In the interior of the island, however, and on its eastern shores, there exists a wild race, who acknowledge no such authority, and of whom little appears to be known. The Chinese tells us, these strange people live in trees like monkeys; but whether this be true or an exaggeration I have no means of stating.

The chief productions and exports of the island are rice and camphor. The rice junks arrive yearly in large numbers at Ningpo from Formosa. The camphor finds its way in native vessels to Amoy, Chinchew, and the Straits, and from thence is exported in large quantities to Europe. Coal is also abundant in many parts, and may at some future period become of great importance to our steam-ships which are now springing up in all directions in these seas.

The hills and valleys, even very near the sea, seem particularly rich and fertile, and I have no doubt that further inland the beauty and fertility are much more striking. Altogether, it is well worth the attention of any government; not with a view to *annexation* or conquest, but to develope its resources, more particularly with regard to coal for our steamers. A new day is beginning to dawn in the east; Japan and China will soon be opened to unfettered commerce; already steamers are making their appearance on these seas and rivers, and it is high time that we should know something of a beautiful island known to be rich and fertile and to have abundant supplies of

coal which only require to be dug out of the earth.

We have had a whole fleet of men-of-war—brigs and steamers of all sizes—in China ever since the termination of the last war, and yet how little has been done to extend our knowledge of an island like this, or, with the exception of Japan, and this was only a year ago, of any part to the eastward of China beyond the 32° of north latitude. In the fruitless search made after the Russian fleet in 1855, the knowledge which we ought to have acquired long ago, but which we had not, might have done us good service.

Within the last year or two our vessels of war have had enough to do, and could not be spared on a service of this kind. The disturbances in China and the piracy on the coast have kept the vessels stationed at the different ports fully employed, and well and nobly have they performed their duties; but some few years ago, I well remember seeing such vessels lying at their anchors with nothing in the world to do for months together, if not for years. In several instances their crews got sick, and when it was too late—when numbers of the hands were dead or dying—the anchors were got up, and the vessels put to sea. Let any one visit the little English burying-ground on the island of Chusan, and he will have a full confirmation of the truth of what I state. Had the commanders of these vessels been ordered to go to sea from time to time, to explore the northern

Chinese coasts and those of Tartary, or to gain a more perfect knowledge of the resources of the islands of Formosa and Japan, a service of great value would have been rendered to commerce, and probably to science, the health of the crews would have been preserved, and numbers of lives saved.

The mandarins we took over to Formosa with the treasure had agreed to pay some two thousand dollars as charter-money for the steamer, and had also promised to give us a sufficient quantity of coal to take us back to the coast of China. It turned out, however, that the said coal had to be sent for some distance inland, and the captain was informed he would have to wait three or four days before he could be supplied. Time is nothing to the Chinese, but it was of great importance to a small tug-steamer. The Chinese were informed that we could not wait; an assertion which they received very coolly, now that themselves and their treasure had been brought safely across the channel. "If we could not wait, we must go; that was all."

During the day of our stay at this port the natives came off in swarms to look at the steamer. They were kindly treated by the officers, and their curiosity was gratified as much as possible. In the afternoon the mandarins brought their friends to see the vessel, and took away their boxes of silver. They were treated with tea and wine, and left us the best of friends. Just before dark, the steam being up, we left them to fight their own

battles with the rebel power, and stood out to sea.

Having steamed rapidly all night, we found ourselves next morning at daybreak not a great distance from the entrance to the Min. It had been a stipulation with the Chinese authorities, when they chartered the vessel, that a messenger, who had been sent over in charge of the money, should be brought back, at least as far as the mouth of the river, in order to report that the sycee had been safely delivered and the conditions of the charter fulfilled. This man, whom I happened to meet afterwards, told me when he made his appearance at Foo-chow the authorities were perfectly astonished, and it was a most difficult matter to convince them that he had been further than the mouth of the river. They had calculated on his being absent a week at the least.

As we had now completed the contract undertaken with the mandarins in Foo-chow, and there being nothing else to detain the vessel, we steamed rapidly northward for the port of Shanghae. We were favoured with delightful weather for steaming; there was scarcely a ripple on the water all the way, and as our captain knew every nook and corner of the coast, we had a rapid and delightful voyage, which will long be remembered by that brave band of passengers who mounted guard that night at the mouth of the Min.

It was now spring in the north of China. At this season the weather in the provinces of Kiang-

nan and Chekiang is most delightful. It is not like an English spring with its easterly winds and cold and cheerless days; nor is it like an Indian one, which is not a spring at all, but rather a hot dry winter, with its leafless trees and burning sand. It is a real genuine spring, which tells one that winter has gone by; the air is cool yet soft, and rendered softer by mild April showers; every tree is bursting into leaf, and how deliciously green these leaves are when they first unfold themselves! The birds are singing in every bush and tree, and all nature seems to rejoice and sing aloud for joy.

In the north of China there are a number of plants which have their flower-buds very prominently developed in autumn, so much so that they are ready to burst into bloom before the winter has quite passed by, or, at all events, on the first dawn of spring. Amongst these *Jasminum nudiflorum* occupies a prominent position. Its yellow blossoms, which it produces in great abundance, may be seen not unfrequently peeping out from amongst the snow, and reminds the stranger in these remote regions of the beautiful primroses and cowslips which grow on the shaded banks of his own land. Nearly as early as this, the pretty daisy-like *Spiræa prunifolia*, the yellow *Forsythia viridissima*, the lilac *Daphne Fortunei*, and the pink Judas-tree, become covered with blossoms, and make our northern Chinese gardens extremely

gay. There are also some good camellias which flower at this time, but they are generally grown in pots under such shelter as mat-sheds and other buildings of a like kind can afford. Two of these varieties are particularly striking. Their flowers are of the most perfect form, and they have striped and self-coloured blossoms upon the same plant. These are now in Mr. Glendinning's nursery at Chiswick, and in a year or two will be common in every collection. The double-blossomed peaches, of which there are several very distinct varieties now in England, are perhaps the gayest of all things which flower in early spring. Fancy, if you can, trees fully as large as our almond, literally loaded with rich-coloured blossoms, nearly as large and double as roses, and you will have some idea of the effect produced by these fine trees in this part of the world.

A little later in the season, that is from the 20th of April to the beginning of May, another race of flowering shrubs and herbaceous plants succeed those I have named. The most conspicuous amongst them are *Viburnum macrocephalum* and *dilatatum*, with their large heads of snow-white flowers; *Spiræa Reevesiana*, and the double variety, which is more beautiful than the original species; *Weigela rosea*, now well known in Europe; Moutans of various hues of colour; Azaleas, particularly the lovely little "Amœna;" *Kerria japonica*, the lilac and white glycines, roses, *Dielytra spectabilis*,

and *Primula cortusoides*. It will easily be believed that with such a host of Flora's beauties these Chinese gardens must be gay indeed. But perhaps the most beautiful sight of all is the *Glycine sinensis*, climbing upon and hanging down from other trees. I believe I noticed in my former works the fine effects produced by this climber when in such situations. I again observed numerous examples this spring, and cannot help drawing attention once more to the subject. The fine plant of this species upon the Chiswick garden-wall is much and justly admired; but imagine a plant equally large, or in some instances much larger, attaching itself to a tree, or even a group of trees, entwining itself round the stems, running up every branch, and weighing down every branchlet; and, in the end of April or beginning of May, covered with flowers, some faint idea may be formed of the fine effects produced by the glycine in its native country. I believe it would not succeed if managed in this way near London, or anywhere in the north; but the experiment would be worth a trial in some parts of Europe, where the summers are warmer than they are in England. As this description may meet the eye of readers in the United States of America, who are as fond of their parks and gardens as we are of ours, I cannot do better than recommend the experiment to them. Many of our northern Chinese plants succeed admirably in America. China and America are both situated on the eastern side of large continents, they are

equally liable to the extremes of heat and cold, and consequently the shrubs and trees of one country are almost certain to succeed as well in the other, provided they are reared in the same latitudes, and grown in the same kind of soil.

CHAPTER XII.

Return to Chekiang — A journey to the interior — Chinese country fair — Small feet of women — How formed, and the results — Stalls at the fair — Ancient porcelain seal same as found in the bogs of Ireland — Theatricals — Chinese actors — Natural productions of the country — Liliaceous medicinal plant — "Cold water temple" — Start for Tsan-tsin — Mountain scenery and productions — Astonishment of the people — A little boy's opinion of my habits.

On arriving at Shanghae I lost no time in returning again to the tea-districts in the interior of the Chekiang province, in order to make again arrangements for further supplies of seeds and plants for the following autumn. I shall not enter into a description of this part of my duties, as it would be nearly a repetition of some of the earlier pages in this work. But during the summer and autumn I had many opportunities of visiting districts in the interior of the country hitherto undescribed, and to these "fresh fields and pastures new," I shall now conduct the reader.

The eastern parts of the province, in which the islands of the Chusan archipelago and the great cities of Hangchow and Ningpo are included, is now pretty well known,—partly through my own researches, and partly through those of other travellers. The central and western parts of this fine province, however, have scarcely as yet been

explored by foreigners, and therefore a short account of its inhabitants and productions, as observed by me during a visit this year, may prove of some interest. Having engaged a small boat at Ningpo to take me up to one of the sources of the river, which flows past the walls of that city, I left late one evening with the first of the flood-tide. We sailed on until daylight next morning, when the ebb made strong against us, and obliged us to make our boat fast to the river's bank, and wait for the next flood. The country through which we had passed during the night was perfectly flat, and was one vast rice-field, with clumps of trees and villages scattered over it in all directions. Like all other parts of China, where the country is flat and fertile, this portion seemed to be densely populated. We were now no great distance from the hills which bound the south-west side of this extensive plain,—a plain some thirty miles from east to west, and twenty from north to south. Part of the road was the same I had travelled the year before on my way to the Snowy Valley.

When the tide turned to run up we again got under way, and proceeded on our journey. In the afternoon we reached the hills; and as our little boat followed the winding course of the stream, the wide and fertile plain through which we had passed was shut out from our view. About four o'clock in the afternoon we reached the town of Ning-Kang-jou, beyond which the river is not

navigable for boats of any size; and here I determined to leave my boat, and make excursions into the surrounding country. It so happened that I arrived on the eve of a fair, to be held next day in the little town in which I had taken up my quarters. As I walked through the streets in the evening of my arrival great preparations were evidently making for the business and gaieties of the following day. The shop-fronts were all decorated with lanterns; hawkers were arriving from all parts of the surrounding country, loaded with wares to tempt the holiday folks; and as two grand theatrical representations were to be given, one at each end of the town, on the banks of the little stream, workmen were busily employed in fitting up the stages and galleries,—the latter being intended for the accommodation of those who gave the play and their friends. Everything was going on in the most good-humoured way, and the people seemed delighted to see a foreigner amongst them, and were all perfectly civil and kind. I had many invitations to come and see the play next night; and the general impression seemed to be, that I had visited the place with the sole intention of seeing the fair.

Retiring early to rest, I was up next morning some time before the sun, and took my way into the country to the westward. Even at that early hour—4 A.M.—the country-roads were lined with people pouring into the town. There were long trains of coolies, loaded with fruits and vegetables;

there were hawkers, with their cakes and sweetmeats to tempt the young; while now and then passed a thrifty housewife, carrying a web of cotton cloth, which had been woven at home, and was now to be sold at the fair. More gaily dressed than any of these were small parties of ladies limping along on their small feet, each one having a long staff in her hand to steady her, and to help her along the mountain-road. Behind each of these parties come an attendant coolie, carrying a basket of provisions, and any other little article which was required during the journey. On politely inquiring of the several parties of ladies where they were going to, they invariably replied in the language of the district "Ta-pa-Busa-la,"—we are going to worship Buddha. Some of the younger ones, particularly the good-looking, pretended to be vastly frightened as I passed them on the narrow road; but that this was only pretence was clearly proved by the joyous ringing laugh which reached my ears after they had passed and before they were out of sight.

It is certainly a most barbarous custom that of deforming the feet of Chinese ladies, and detracts greatly from their beauty. Many persons think that the custom prevails only amongst persons of rank or wealth, but this is a great mistake. In the central and eastern provinces of the empire it is almost universal,—the fine ladies who ride in sedan-chairs, and the poorer classes who toil from morning till evening in the fields, are all deformed

in the same manner. In the more southern provinces, such as Fokien and Canton, the custom is not so universal; boat-women and field-labourers generally allow their feet to grow to the natural size. Here is one of a peculiar class of country-women, to be met with near Foo-chow, from the talented pencil of Mr. Scarth.

Foo-chow Countrywoman.

Dr. Lockhart, whose name I have already mentioned in these pages, gives the following as the results of his extensive and varied experience on this subject. He says :—

" Considering the vast number of females who have the feet bound up in early life, and whose feet are then distorted, the amount of actual disease of the bones is small; the ancle is generally tender, and much walking soon causes the foot to

swell, and be very painful, and this chiefly when the feet have been carelessly bound in infancy. To produce the diminution of the foot, the tarsus or instep is bent on itself, the os calcis or heel-bone thrown out of the horizontal position, and what ought to be the posterior surface, brought to the ground; so that the ancle is, as it were, forced higher up than it ought to be, producing in fact artificial Talipes Calcaneus; then the four smaller toes are pressed down under the instep, and checked in their growth, till at adult age all that has to go into the shoe is the end of the os calcis and the whole of the great toe. In a healthy constitution this constriction of the foot may be carried on without any very serious consequences; but in scrofulous constitutions the navicular bone, and the cuneiform bone supporting the great toe, are very liable, from the constant pressure and irritation to which they are exposed, to become diseased; and many cases have been seen where caries, softening, and even death of the bone have taken place, accompanied with much suppuration and great consequent suffering. Chinese women have naturally very small hands and feet, but this practice of binding the feet utterly destroys all symmetry according to European ideas, and the limping uncertain gait of the women is, to a foreigner, distressing to see. Few of the Chinese women can walk far, and they always appear to feel pain when they try to walk quickly, or on uneven ground.

"The most serious inconvenience to which women with small feet are exposed," he observes, "is that they so frequently fall and injure themselves. During the past year, several cases of this kind have presented themselves. Among them was one of an old woman, seventy years of age, who was coming down a pair of stairs and fell, breaking both her legs; she was in a very dangerous state for some time, on account of threatened mortification of one leg, but the unfavourable symptoms passed off, and finally the bones of both legs united, and she is able to walk again.

"Another case was also that of an elderly woman, who was superintending the spring cutting of bamboo shoots in her field, when she fell over some bamboos, owing to her crippled feet slipping among the roots; a compound fracture of one leg was the consequence, and the upper fragment of the bone stuck in the ground; the soft parts of the leg were so much injured, that amputation was recommended, but her friends would not hear of it, and she soon afterwards died from mortification of the limb.

"The third case was that of a woman, who also fell down stairs and had compound fracture of the leg; this case is still under treatment, and is likely to do well, as there was not very much injury done to the soft parts in the first instance."

About eight o'clock I returned to the town, and took the principal temple on my way. The sight which presented itself here was a curious and

striking one. Near the doors were numerous venders of candles and joss-stick, who were eagerly pressing the devotees to buy; so eager were they, indeed, that I observed them in several instances actually lay hold of the people as they passed; and strange to say, this rather rough mode of getting customers was frequently successful. Crowds of people were going in and coming out of the temple exactly like bees in a hive on a fine summer's day. Some halted a few moments to buy their candles and incense from the dealers already noticed; while others seemed to prefer purchasing from the priests in the temple. Nor were the venders confined to those who sold things used only in the worship of Buddha. Some had stalls of cakes and sweetmeats; others had warm and cold tea, snuff-bottles, fans, and a hundred other fancy articles which it is needless to enumerate. Doctors were there who could cure all diseases; and fortune-tellers, too, seemed to have a full share of patronage from a liberal and enlightened public. In front of the altar other scenes were being acted. Here the devotees—by far the largest portion being females—were prostrating themselves many times before the Gods; and each one, as she arose from her knees, hastened to light some candles and incense, and place these upon the altar, then returning to the front, the prostrations were again repeated, and then the place was given up to another, who repeated the same solemn farce. And so they went on during the whole of that day,—

on which many thousands of people must have paid their vows at these heathen altars.

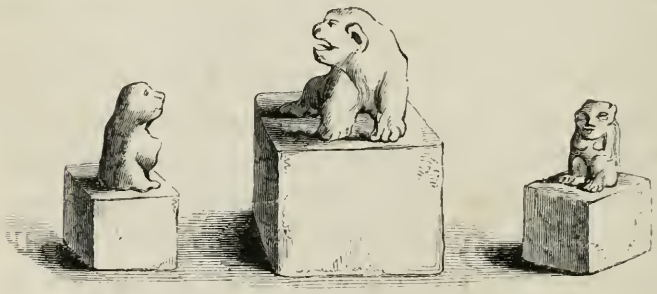
I may here mention, in passing, that I picked up two articles at this place, of considerable interest to antiquaries in Europe. One was a small porcelain bottle, exactly similar in size, form and colouring to those found in ancient Egyptian tombs. The characters on one side are also identical, and are a quotation from one of the Chinese poets—"*Only in the midst of this mountain.*"

I have already alluded to these bottles in one of the earlier chapters, and need say nothing further about them here. They are to be met with not unfrequently in doctors' shops and old stalls; several persons, both in China and England, possess specimens.

The other article I have mentioned is far more curious and interesting. It is a small porcelain seal identical with those found of late years in the bogs of Ireland. On the 6th of May, 1850, Mr. Getty read a very curious and interesting paper on this subject before the Belfast Literary Society, and he has since published it with drawings and descriptions of the different seals. One was found when ploughing a field in Tipperary, another in the county of Down, a third in the bed of the river Boyne, and a fourth near Dublin. That these seals have lain in the bogs and rivers of Ireland for many ages there cannot be the slightest doubt. The peculiar white or rather cream-coloured porcelain of which they are composed,

has not been made in China for several hundred years. The Chinese, who laugh at the idea of the bottles being considered ancient which have been found in the tombs of Egypt, all agree in stating that these seals are from one thousand to two thousand years old.

They are very rare in China at the present day. I had the greatest difficulty in getting the few which are now in my possession, although my opportunities of picking up such things were greater than those of most persons in China. It is therefore absurd to suppose that those found in Ireland can have been brought over of late years by sailors, or captains of ships, or even by either of the two embassies to Peking. Here is a sketch of some of those found in China at the present day. Those who are fortunate enough to possess the Irish ones will see an exact resemblance to their own.



Ancient Porcelain Seals.

There is therefore no doubt that those rare and ancient seals found in China at the present day

are identical with those found in Ireland. That the latter must have been brought over at a very early period, and that they must have lain for many ages in the bogs and rivers of that island seems also quite certain. But when they came there, how they came, and what were the circumstances connected with their introduction, are questions which we cannot answer. To do this satisfactorily we should probably have to consult a book of history, written, studied, and lost long before that of the present history of Ireland.

The streets of the town were now crowded with people; and the whole scene reminded me of a fair in a country-town in England. In addition to the usual articles in the shops, and an unusual supply of fruits and vegetables, there was a large assortment of other things which seemed to be exposed in quantity only on a fair-day. Native cotton cloths, woven by handlooms in the country, were abundant,—mats made from a species of Juncus, and generally used for sleeping upon,—clothes of all kinds, both new and second-hand,—porcelain and wooden vessels of various sorts,—toys, cakes, sweetmeats, and all the common accompaniments of an English fair. Various textile fibres of interest were abundant, being produced in large quantities in the district. Amongst these, and the chief, were the following: — hemp, jute, China grass (so called)—being the bark of *Urtica nivea*—and the Juncus already noticed. A great number of the wooden vessels were made of the wood of

Cryptomania japonica, which is remarkable for the number of beautiful rings and veins which show to great advantage when the wood is polished.

In the afternoon the play began, and attracted its thousands of happy spectators. As already stated, the subscribers, or those who gave the play, had a raised platform, placed about twenty yards from the front of the stage, for themselves and their friends. The public occupied the ground on the front and sides of the stage, and to them the whole was free as their mountain-air,—each man, however poor, had as good right to be there as his neighbour. And it is the same all over China :— the actors are paid by the rich, and the poor are not excluded from participating in the enjoyments of the stage.

The Chinese have a curious fancy for erecting these temporary theatres on the dry beds of streams. In travelling through the country I have frequently seen them in such places. Sometimes, when the thing is done in grand style, a little tinsel town is erected at the same time, with its palaces, pagodas, gardens, and dwarf plants. These places rise and disappear as if by the magic of the enchanter's wand, but they serve the purposes for which they are designed, and contribute largely to the enjoyment and happiness of the mass of the people.

On the present occasion I did not fail to accept the invitations which had been given me in the earlier part of the day. As I did not intend to

remain for a great length of time I was content to take my place in the "pit," which I have already said is free to the public. But the parties who had given the play were too polite to permit me to remain amongst the crowd. One of them—a respectable-looking man, dressed very gaily—came down and invited me to accompany him to the boxes. He led me up a narrow staircase and into a little room in which I found several of his friends amusing themselves by smoking, sipping tea, and eating seeds and fruits of various kinds. All made way for the stranger, and endeavoured to place me in the best position for getting a view of the stage. What a mass of human beings were below me! The place seemed full of heads, and one might suppose that the bodies were below, but it was impossible to see them, so densely were they packed together. Had it not been for the stage in the background with its actors dressed in the gay-coloured costumes of a former age, and the rude and noisy band, it would have reminded me more of the hustings at a contested election in England than anything else. But taken as a whole, there was nothing to which I could liken it out of China.

The actors had no stage-scenery to assist them in making an impression on the audience. This is not the custom in China. A table, a few chairs, and a covered platform are all that is required. No ladies are allowed to appear as actresses in the country, but the way in which the sex is imitated

is most admirable, and always deceives any foreigner ignorant of the fact I have stated.

In the present instance each actor repeated his part in a singing falsetto voice. The whole interest of the piece must have lain in the story itself, for there was nothing natural in the acting, the sham sword-fights perhaps excepted. One or two of these occurred in the piece during the time I was a spectator, and they were certainly natural enough, thoroughly Chinese and very amusing. An actor rushed upon the stage amid the clashing of timbrels, beating of gongs, and squeaking of other instruments. He was brandishing a short sword in each hand, now and then wheeling round apparently to protect himself in the rear, and all the time performing the most extraordinary actions with his feet, which seemed as if they had to do as much of the fighting as the hands. People who have seen much of the manœuvring of Chinese troops will not call this unnatural acting. But whatever a foreigner might think of such "artistes," judging from the intense interest and boisterous mirth of a numerous audience, they performed their parts to the entire satisfaction of their patrons and the public.

"How-pa-how," said my kind friends, as I rose to take my leave; "is it good or bad?" Of course I expressed my entire approbation, and thanked them for the excellent view I had enjoyed of the performance through their politeness. It was now night—dark—the lanterns were lighted,

the crowd still continued, and the play went on. Long after I left them, and even when I retired for the night, I could hear, every now and then, borne on the air the sounds of their rude music, and the shouts of applause from a good-humoured multitude.

The natural productions of this part of China now claim a share of our attention. Much of the level land among the hills in this part of the country, being considerably higher than the great Ningpo plain, is adapted to the growth of other crops than rice. The soil in these valleys is a light rich loam, and is in a state of high cultivation; indeed, I never witnessed fields so much like gardens as these are. The staple summer crops are those which yield textile fibres, such as those I saw in the fair already described. A plant well known by the name of jute in India—a species of Corchorus—which has been largely exported to Europe of late years from India, is grown here to a very large extent. In China this fibre is used in the manufacture of sacks and bags for holding rice and other grains. A gigantic species of hemp (Cannabis) growing from ten to fifteen feet in height, is also a staple summer crop. This is chiefly used in making ropes and string of various sizes, such articles being in great demand for tracking the boats up rivers, and in the canals of the country. Every one has heard of China grass-cloth,—that beautiful fabric made in the Canton province, and largely exported to Europe and

America. The plant which is supposed to produce this (*Urtica nivea*) is also abundantly grown in the western part of this province, and in the adjoining province of Kiangse. Fabrics of various degrees of fineness are made from this fibre, and sold in these provinces; but I have not seen any so fine as that made about Canton. It is also spun into thread for sewing purposes, and is found to be very strong and durable. There are two very distinct varieties of this plant common in Chekiang —one the cultivated, the other the wild. The cultivated variety has larger leaves than the other; on the upper side they are of a lighter green, and on the under they are much more downy. The stems also are lighter in colour, and the whole plant has a silky feel about it which the wild one wants. The wild variety grows plentifully on sloping banks, on city walls, and other old and ruinous buildings. It is not prized by the natives, who say its fibre is not so fine, and more broken and confused in its structure than the other kind. The cultivated kind yields three crops a year.

The last great crop which I observed was that of a species of juncus, the stems of which are woven into beautiful mats, used by the natives for sleeping upon, for covering the floors of rooms, and for many other useful purposes. This is cultivated in water, somewhat like the rice-plant, and is therefore always planted in the lowest parts of these valleys. At the time of my visit, in the beginning of July, the harvest of this crop had just com-

menced, and hundreds of the natives were busily employed in drying it. The river's banks, uncultivated land, the dry gravelly bed of the river, and every other available spot was taken up with this operation. At grey dawn of morning the sheaves or bundles were taken out of temporary sheds, erected for the purpose of keeping off the rain and dew, and shaken thinly over the surface of the ground. In the afternoon, before the sun had sunk very low in the horizon, it was gathered up again into sheaves and placed under cover for the night. A watch was then set in each of the sheds; for however quiet and harmless the people in these parts are, there is no lack of thieves, who are very honest if they have no opportunity to steal. And so the process of winnowing went on day by day until the whole of the moisture was dried out of the reeds. They were then bound up firmly in round bundles, and either sold in the markets of the country, or taken to Ningpo and other towns where the manufacture of mats is carried on, on a large scale.

The winter crops of this part of China consist of wheat, barley, the cabbage oil-plant, and many other kinds of vegetables on a smaller scale. Large tracts of land are planted with the bulbs of a liliaceous plant—probably a *Fritillaria*—which are used in medicine. This is planted in November, and dug up again in April and May. In March these lily-fields are in full blossom, and give quite a feature to the country. The flowers

are of a dingy greyish white, and not very ornamental.

It seems to me to be very remarkable that a country like China,—rich in textile fibre, oils of many kinds, vegetable tallow, dyes, and no doubt many other articles which have not come under my notice—should afford so few articles for exportation. I have no doubt that as the country gets better known, our merchants will find many things besides silk and tea, which have hitherto formed almost the only articles exported in quantity to Europe and America.

When I was travelling in the part of the country I have been describing, the weather was extremely hot,—July and August being the hottest months of the year in China. When complaining of the excessive heat to some of my visitors, I was recommended to go to a place called by them the *Lang-shuy-ain*, or "cold water temple," situated in the vicinity of the town in which I was staying. In this place they told me both air and water were cold notwithstanding the excessive heat of the weather. On visiting the place I found it an old, dilapidated building, which had evidently seen more prosperous days. Ascending a few stone steps, I reached the lower part of the edifice, when I felt at once a sudden change in the temperature, something like that which one experiences on going into an ice-house on a hot summer's day. My guide led me to the further corner of this place, and pointed to some stone steps which

seemed to lead down to a cave or some such subterranean place, and desired me to walk down. As it appeared perfectly dark to me on coming from the bright sunshine, I hesitated to proceed without a candle. On this being brought, I was much disappointed in finding the steps were only a few in number and led to nowhere. It appeared that in the more prosperous days of the temple there had been a well of clear water at the bottom of the steps, but now that was choked up with stones and rubbish. I was able, however, to procure a little water nearly as cold as if it had been iced. The stones in this part of the building were also very cold to the touch, and a strong current of cold air was coming out of the earth at this particular point. I regretted much not having my thermometer with me to have tested the difference of the temperature with accuracy. On the floor of the temple a motley group of persons was presented to my view. Beggars, sick persons, and others who had taken refuge from the heat of the sun were lolling about, evidently enjoying the cool air which filled the place. It appeared to be free to all, rich and poor alike. There are some large clay-slate and granite quarries near this place; and I afterwards found several springs of water issuing from the clay-slate rocks quite as cold as that in the "cold water temple."

Having spent several days in the town of Ning-kang-jou, I determined to proceed onwards to a large temple situated amongst the hills to the

westward, and distant, as I was informed, some twenty or thirty le. Packing up my bed and a few necessaries, I started in a mountain chair one morning, after an early breakfast. Leaving the town behind me, the road led me winding along the side of a hill, following the course of the little stream. The scenery here was perfectly enchanting. The road, though narrow, like all Chinese roads, was nicely paved and oftentimes shaded by the branches of lofty trees. Above me rose a sloping hill, covered with trees and brushwood, while a few feet below me was seen the little stream trickling over its gravelly bed and glistening in the morning sun. Now and then I passed a pool where the water was still and deep, but generally the river, which is navigable for large ships at Ningpo, was here not more than ankle deep. Shallow as it was, however, the Chinese were still using it for floating down the productions of these western hills. Small rafts made of bamboo, tiny flat-bottomed boats, and many other contrivances were employed to accomplish the end in view. When the river was so shallow that the boatman could not use his scull, he might oftentimes be seen walking in the river and dragging his boat or raft over the stones into deeper water. As I passed along, I observed several anglers busily employed with rod and line —real Izaak Waltons it seemed—and although they did not appear very expert, and their tackle was rather clumsy, yet they generally succeeded

in getting their baskets well filled. Altogether, this scene, which I can only attempt to describe, was a charming one,—a view of Chinese country-life, telling plainly that the Chinese, however strange they may sometimes appear, are, after all, very much like ourselves.

My road at length left the hill-side and little stream, and took me across a wide and highly cultivated valley, several miles in extent, and surrounded on all sides by hills, except that one through which the river winded in its course to the eastward. I passed through two small towns in this valley where the whole population seemed to turn out to look at me. Everywhere I was treated with the most marked politeness, and even kindness, by the inhabitants. "Stop a little, sit down, drink tea," was said to me by almost every one whose door I passed. Sometimes I complied with their wishes; but more generally I simply thanked them, and pushed onwards on my journey. In the afternoon I arrived at the further end of the valley and at the foot of a mountain pass. As I gradually ascended this winding path, the valley through which I had passed was entirely shut out from my view. Nothing was now seen but mountains, varying in height and form,—some about 2000, and others little less than 4000 feet above the level of the sea,—some formed of gentle slopes, with here and there patches of cultivation, —others steep and barren, where no cultivation can ever be carried on, except that of brushwood,

which the most barren mountains generally furnish. The Chinese pine and Japan cedar were almost the only trees of any size which I observed as I passed along. A little higher up I came to fine groves of the bamboo—the famous *maou-chok*, already noticed—the finest variety of bamboo in China, and always found growing in the vicinity of Buddhist temples.

In a small valley amongst these mountains, some 2000 feet high, the temple of Tsan-tsing was at last seen peeping out from amongst the trees. The building in itself is of a much less imposing character than others I have seen in this province and in Fokien; but, like all others of its kind, it is pleasantly situated in the midst of the most romantic scenery. In addition to the pines and bamboos already noticed, were several species of oaks and chesnuts, the former producing good-sized timber. But the finest tree of all, and quite new to me, was a beautiful species of cedar or larch; which I observe Dr. Lindley, to whom I sent specimens, calls *Abies Kæmpferi*.

When I entered the court of the temple the priests seemed quite lost in astonishment. No other foreigner, it seemed, had been there before, and many of them had only heard of us by name. Some of them stood gazing at me as if I were a being from another world, while others ran out to inform their friends of my arrival. My request for quarters was readily granted; and being now an old traveller, I was soon quite at home amongst

my new friends. Late in the afternoon, long trains of coolies — men and boys — passed the temple from a district further inland, loaded with young bamboo shoots, which are eaten as a vegetable and much esteemed. The news of the arrival of a foreigner at the temple seemed to fly in all directions; and we were crowded during the evening with the natives, all anxious to get a glimpse of me. Some seemed never tired of looking at me; others had a sort of superstitious dread mingled with curiosity. One little urchin, who had been looking on with great reverence for some time, and on whom I flattered myself I had made a favourable impression, undeceived me by putting the following simple question to his father:—"If I go near him, will he bite me?" This, I confess, astonished me; for although I had no tail,—was not exactly the same colour as they were,—and did not wear the same kind of dress,—I did not expect to be taken for a wild animal. What strange tales must have been told these simple country people of the *barbarians* during the last Chinese war?

CHAPTER XIII.

A dinner audience — Adventure with a priest — Sanatarium for Ningpo missionaries and others — Abies Kæmpferi — Journey to Quan-ting — Bamboo woods and their value — Magnificent scenery — Natives of Poo-in-chee — Golden bell at Quan-ting — Chinese traditions — Cold of the mountains — Journey with Mr. Wang — A disappointment — Adventure with pirates — Strange but satisfactory signal — Results.

THE bedroom which I expressed a wish to occupy, as it seemed somewhat cleaner than the others, was used during the day by an itinerant tailor, a native of Fung-hwa-heen, who was in the habit of going from place to place to mend or make the garments of his customers. This man willingly removed to other quarters, and gave the room up to me. He was a good specimen of his race, shrewd, intelligent, and formed a striking contrast to the priest for whom he was working. Never in all my travels in China had I met with such poor specimens of the human race as these same priests. They had that vacant stare about them which indicated want of intellect, or at least, a mind of a very low order indeed. They did nothing all day long but loll on chairs or stools, and gaze upon the ground, or into space, or at the people who were working, and then they did not appear to see what was going on, but kept looking

on and on notwithstanding. The time not spent in this way was when they were either eating or sleeping. They were too lazy to carry on the services of the temple, which they deputed to a little boy. And thus they spent their days, and in this manner they would float down the stream of time until they reached the ocean of eternity and were no more seen.

There were four or five of these men connected with the old monastery, and two or three boys, who were being reared to succeed them. All the men were apparently imbecile, but the superior seemed to be in a state approaching to insanity. I seemed to have an extraordinary attraction for this man; he never took his eyes off me; wherever I went he followed at a certain distance behind, stopping when I stopped, and going on again when I went on. When I entered the house he came and peeped in at the window, and when I made the slightest motion towards him, he darted off in an instant, but only to return again. I began to think his actions extraordinary, and to feel a little uneasy about his ultimate intentions. The place and the people were all strange to me, and it might so happen that the man was really unsafe. By day there was no fear, as I could easily protect myself; but what if he fell upon me unawares at night, when I was asleep! I therefore sent for Tung-a, one of my servants, and desired him to go out and make some enquiries concerning the propensities of the mad priest.

Tung-a returned laughing, and told me there was no danger; the man was not mad, but that it was partly fear and partly curiosity which made him act in the manner he was doing, and further, that I was the first specimen of my race he had seen.

During the time I was at dinner, and for some time after, in addition to some of the more respectable who were admitted into the room, the doors and windows were completely besieged with people. Every little hole or crevice had a number of eager eyes peeping through it, each anxious to see the foreigner feed. Having finished my dinner and smoked a cigar, much to the delight of an admiring audience, I politely intimated that it was getting late, that I was tired with the exertions of the day, and that I was going to bed. My inside guests rose and retired, but it seemed to me they only went outside to join the crowd, and they were determined to see the finale; they had seen how I eat, drank, and smoked my cigar, and they now wanted to see how and in what manner I went to bed. My temper was unusually sweet at this time, and therefore I had no objection to gratify them even in this, providing they remained quiet and allowed me to get to sleep. A traveller generally does not spend much of his time over the toilet, either in dressing or undressing, so that in less time than I would take to describe it I was undressed, the candle was put out, and I was in bed. As there was nothing more to be seen the crowd left my window, and as

they retired I could hear them laughing and talking about what they had seen.

The chamber in which the head-priest, whom I have described, was wont to repose after the fatigues of the day, was behind the one occupied by me, and it appeared it was necessary to come through mine in order to get into it. I had examined the chamber and learned to whom it belonged in the course of the evening. Not caring to be disturbed by having my door opened and a person walking through my room after I was in bed and asleep, I had suggested to the priest the propriety of going to bed about the same time as I did. When the crowd therefore had left my windows, I heard one or two persons whispering outside and still lingering there. I called out to them and desired them to go away to their beds. "Loya, Loya!"* a voice cried, "the Ta-Hosan (high-priest) wants to go to bed." "Well," said I, "come along, the door is not locked." "But he has not had his supper yet," another voice replied. "Tell him to go and get it then, as quickly as possible, for I do not wish to be disturbed after I go to sleep."

The fatigue of climbing the mountain-pass, and the healthy fresh air of the mountains, soon sent me to sleep, and I dare say the priest might have walked through the room without my knowing anything about it. How long I slept I know not,

* Mode of addressing mandarins and high government officers—a term of respect.

for the room was quite dark; but I was awakened by the same voices which had addressed me before, and again informed that the Ta-Hosan wanted to come to bed.

"Well, well, come to bed and let me have no more of your noise," said I, being at the time half-asleep and half-awake; and going off sound again immediately I heard no more. Next morning, when I awoke, the day was just beginning to dawn, and daylight was streaming through the paper window and rendering the tables and chairs in the apartment partially visible. The proceedings of the evening seemed to have got mixed up somehow with my dreams, but as they became gradually distinct to the mind, and separated, I began to wonder whether my friend the priest had occupied his bedroom during the night. The door was closed and seemed in the same state in which I left it when I went to bed, and I could hear no sound of anything breathing or moving through the thin partition-wall which divided our rooms. In order to satisfy myself I gently opened the door and looked in. But no priest was there. The bed had been prepared, and the padded coverlet carefully folded for his reception, but all remained in the same condition, and showed plainly that no one had occupied the room during the night.

Tung-a now made his appearance with my morning cup of tea. It turned out on inquiry that the poor old priest could not get over his

superstitious dread of me; he was anxious to get to his own bed, and had striven hard to accomplish his object; but it was quite beyond his power. It was now easy enough to account for his conduct at my window the night previous. When it was found he could not conquer his fears a brother priest gave him a share of his bed, and I had been left to the undisturbed repose which I greatly required.

The valley of Tsan-tsin, as I have already stated, is high up amongst the mountains, some 1500 or 2000 feet above the level of the sea. It is completely surrounded by mountains, many of them apparently from 3000 to 4000 feet high. Even in the hot summer months, although warm during the day in the sun, the evenings, nights, and mornings, are comparatively cool. At this time of the year the southwest monsoon is blowing, but ere it reaches the valley it passes over a large tract of high mountains, and consequently gets cooled on its course. This appears to be the reason why the country, even at the foot of the mountains here, is cooler than further down in the Ningpo valley.

I have frequently thought this would make an admirable sanitary station for the numerous missionaries and other foreigners who live at Ningpo. Could the Chinese authorities be induced to allow them to build a small bungalow or two in the valley, they might thus have a cool and healthy retreat to fly to in case of sickness. It is easy of

access even to invalids, and could be reached in a day and a half, or at most two days from Ningpo.

I have already noticed a new cedar or larch-tree named *Abies Kæmpferi* discovered amongst these mountains. I had been acquainted with this inte-

Larch Tree.

resting tree for several years in China, but only in gardens, and as a pot plant in a dwarfed state. The Chinese, by their favourite system of dwarfing, contrive to make it, when only a foot and a half or two feet high, have all the characters of

an aged cedar of Lebanon. It is called by them the *Kin-le-sung*, or Golden Pine, probably from the rich yellow appearance which the ripened leaves and cones assume in the autumn. Although I had often made enquiries after it, and endeavoured to get the natives to bring me some cones, or to take me to a place where such cones could be procured, I met with no success until the previous autumn, when I had passed by the temple from another part of the country. Their stems, which I measured, were fully five feet in circumference two feet from the ground, and carried this size, with a slight diminution, to a height of 50 feet, that being the height of the lower branches. The total height I estimated about 120 or 130 feet. The stems were perfectly straight throughout, the branches symmetrical, slightly inclined to the horizontal form, and having the appearance of something between the cedar and larch. The long branchless stems were, no doubt, the result of their growing close together and thickly surrounded with other trees, for I have since seen a single specimen growing by itself on a mountain side at a much higher elevation, whose lower branches almost touched the ground. This specimen I shall notice by-and-by.

I need scarcely say how pleased I was with the discovery I had made, or with what delight, with the permission and assistance of the good priests, I procured a large supply of those curious cones sent to England in the winter of 1853.

I now lost no time in visiting the spot of my last year's discovery. The trees were there as beautiful and symmetrical as ever, but after straining my eyes for half-an-hour I could not detect a single cone. I returned to the temple and mentioned my disappointment to the priests, and asked them whether it was possible to procure cones from any other part of the country. They told me of various places where there were trees, but whether these had seed upon them or not they could not say. They further consoled me with a piece of information, which, although I was most unwilling to believe it, I knew to be most likely too true, namely, that this tree rarely bore cones two years successively, that last year was its bearing year, and that this one it was barren. A respectable looking man, who was on a visit to the temple, now came up to me and said that he knew a place where a large number of trees were growing, and that if I would visit the temple to which he belonged he would take me to this spot, and that there I would probably find what I wanted. I immediately took down the name of his residence, which he told me was Quan-ting, a place about twenty le distant from the temple in which I was domiciled, and at a much higher elevation on the mountains. After making an appointment for next day he took his leave of me with great politeness, and returned to his home.

Having procured a guide for Quan-ting, I set out early next day to visit my new acquaintance.

Leaving the temple of Tsan-tsing, our way led up a steep pass, paved with granite stones. On each side of the road were forests of fine bamboos—the variety called by the Chinese *Maou*, the finest I ever saw. The forests are very valuable, not only on account of the demand for the full-grown bamboos, but also for the young shoots, which are dug up and sold in the markets in the early part of the season. Here, too, were dense woods of *Cryptomeria*, *Cunninghamia lanceolata*, oaks, chesnuts, and such like representatives of a cold or temperate climate.

On the road up the mountain pass I met long trains of coolies, heavily laden with bamboos, and on their way to the plains. The weight of the loads which these men carry is perfectly astonishing; even little boys were met carrying loads which I found some difficulty in lifting. All these people are accustomed to this work from their earliest years, and this is no doubt one of the reasons why they are able to carry such heavy loads.

This fine bamboo may be regarded as a staple production amongst these mountains, and one of great value to the natives. In the spring and early summer months its young shoots furnish a large supply of food of a kind much esteemed by the Chinese. At that time of the year the same long trains of coolies which I had just met carrying the trees, may then be seen loaded with the young shoots. The trees in the autumn and the

young shoots in spring, are carried down to the nearest navigable stream, where they are put on rafts, or in small flat-bottomed boats, and conveyed a few miles down until the water becomes deep enough to be navigated by the common boats of the country. They are then transferred into the larger boats, and in them conveyed to the populous towns and cities in the plain, where they always find a ready sale. Thus this valuable tree, which is cultivated at scarcely any expense, gives employment and food to the natives of these mountains for nearly one-half the year. All the way up the mountain passes the axe of the woodman was heard cutting down the trees. In many parts the mountains were steep enough for the trees to slide down to the road without any more labour than that required to set them in motion.

When I reached the top of this pass I got into a long narrow valley—the valley of Poo-in-chee—where the road was nearly on a level. This valley must be nearly 1000 feet higher than Tsan-tsing, or between two and three thousand feet above the level of the plain. At the top of the mountain-pass, and just before entering this valley, some most glorious views were obtained. Behind, before, and on my left hand, there was nothing but steep and rugged mountains covered with grass and brushwood, but untouched by the hand of man, while far down below in a deep dell, a little stream was dashing over its rocky bed and hurrying onwards to swell the river in

the plain with its clear, cool waters. A little further on, when I looked to my right hand, a view of another kind, even grander still, met my eye. An opening in the mountain exposed to view the valley of Ningpo lying far below me, and stretching away to the eastward for some thirty miles, where it meets the ocean, and appeared bounded by the islands in the Chusan Archipelago. Its cities, villages, and pagodas were dimly seen in the distance, while its noble river was observed winding through the plain and bearing on its surface hundreds of boats, hurrying to and fro, and carrying on the commerce of the country. The picture was grand and sublime, and the impression produced by it then must ever remain engraved on my mind.

The village of Poo-in-chee is a straggling little place and contains but few inhabitants. Many of these mountaineers—indeed, the greater part of them—had never seen a foreigner in their lives. As I approached the village the excitement amongst them was very great. Every living thing—men, women, and children, dogs, and cats—seemed to turn out to look at me. Many of them, judging from the expression on their countenances, were not entirely free from fear. "I might be harmless, but it was just as possible I might be a cannibal, or somewhat like a tiger." In circumstances of this kind it is always best to take matters coolly and quietly. Observing a respectable-looking old man sitting in front of one

of the best houses in the village, I went up to him and politely asked him if he "had eaten his rice." He called out immediately to a boy to bring me a chair, and begged me to rest a little before I proceeded on my journey. As usual, tea was brought and set before me. As I chatted away with the old man, the natives gathered confidence and crowded round us in great numbers. Their fears soon left them when they found I was much like one of themselves, although without a tail. Everything about me was examined and criticised with the greatest minuteness. My hat, my clothes, my shoes, and particularly my watch, were all objects which attracted their attention. I took all this in good part, answered all their questions, and I trust when I left them their opinion of the character of foreigners had somewhat changed.

Another mountain-pass had now to be got over, nearly as high as the last one. When the top of this was gained, I found I was now on the summit of the highest range in this part of the country. Our road now winded along the tops of the mountains at this elevation for several miles, and at last descended into the Quan-ting valley, for which I was bound. This was somewhat like the Poo-in-chee valley just described, and apparently about the same elevation.

Having reached the temple, I had no difficulty in finding my acquaintance of the previous day, Mr. Wang-a-nok, as he called himself. It now

appeared he was a celebrated cook — the Soyer of the district—and had been engaged on this day to prepare a large dinner for a number of visitors who had come to worship at the temple. He told me he would be ready to accompany me as soon as the dinner was over, and invited me to be seated in the priest's room until that time. As there was nothing in the temple of much interest, I preferred taking a stroll amongst the hills. Before I set out I made inquiry of Wang and the priest whether there were any objects of interest in the vicinity more particularly worth my attention. I was told there was one place of more than common interest, which I ought to see, and at the same time several persons offered to accompany me as guides. We then started off to inspect the new wonder, whatever it might turn out to be.

A short distance in the rear of the temple my guides halted at the edge of a little pool, which was surrounded with a few willows and other stunted bushes. They now pointed to the little pool, and informed me this was what they had brought me to see. "Is this all?" said I, with features which, no doubt, expressed astonishment; "I see nothing here but a small pond, with a few water-lilies and other weeds on its surface." "Oh, but there is a golden bell in that pool," they replied. I laughed, and asked them if they had seen it, and why they did not attempt to get it out. They replied that none of them had seen

it, and that it was impossible to get it out; but that it was there, nevertheless, they firmly believed. I confess I was a good deal surprised, and was half inclined to think my friends were having a good-humoured joke at my expense, but again, when I looked in their faces, I could detect nothing of this kind expressed in any of their countenances. Much puzzled with this *curiosity*, and not being able to gain any information calculated to unravel the mystery, I determined to keep the subject in mind, and endeavour to get an explanation from some one who was better informed than these countrymen appeared to be.

A short time after this I happened to meet a Chinese gentleman who had travelled a great deal in many parts of his own country, and whose intelligence was of a higher order than that of his countrymen generally. To this man I applied for a solution of the *Kin-chung*, or golden bell. When I had described what I had seen at Quanting, he laughed heartily, and informed me that it was simply a superstition or tradition which had been handed down from one generation to another, and that the ignorant believed in the existence of such things although they did not endeavour to account for them. He further informed me such traditions were very common throughout China, particularly about Buddhists' temples and other remarkable places visited by the natives for devotional purposes. Thus, at the falls in the Snowy Valley, which I have already

noticed, there was said to be a *Heang-loo*, or incense burner, of fabulous size, which no one had ever seen or were likely to see; and a large white horse was said to reside somewhere in the mountain called T'hae-bah-san, which rises to the height of 2000 feet behind the old monastery of Tein-tung. All these were simply traditionary stories, which are believed by the vulgar and ignorant, but, as my informant said, are laughed at by men of education and sound sense.

Not being able to find the golden bell, and as the sight of the spot where it was supposed to be had not produced the impression which my companions and guides had supposed it would, they dropped off, one by one, and returned to the temple, while I was left alone to ramble amongst the wild scenes of these mountains. There was, however, little time to spare, and I was most anxious to secure the services of Mr. Wang the moment he had finished his culinary operations. I, therefore, returned to the temple, and arrived there soon after the group who had taken me to see the golden bell. I found them explaining to the priests and other visitors how disappointed I had been, and how incredulous I was as to the existence of the said bell itself.

The temple of Quan-ting has no pretensions as regards size, and appeared to be in a most dilapidated condition. In one of the principal halls I observed a table spread and covered with many good things, which were intended as an offering

to Buddha. The expected visitors, who appeared to be the farmers and other respectable inhabitants of the neighbourhood, were arriving in considerable numbers, and each one as he came in prostrated himself in front of the table.

As the valley in which the temple is placed is fully 3000 feet above the sea, I felt the air most piercingly cold, although it was only the middle of October, and hot enough in the plains in the daytime. So cold was it that at last I was obliged to take refuge in the kitchen, where Mr. Wang was busy with his preparations for the dinner, and where several fires were burning. This place had no chimney, so the smoke had to find its way out through the doors, windows, or broken roof, or, in fact, any way it could. My position here was, therefore, far from being an enviable one, although I got a little warmth from the fires. I was, therefore, glad when dinner was announced, as there was then some prospect of being able to get the services of Mr. Wang. The priests and some of the visitors now came and invited me to dine with them, and, although I was unwilling, they almost dragged me to the table. In the dining-room, which was the same, by-the-bye, in which they were worshipping on my arrival, I found four tables placed, at one of which I was to sit down, and I was evidently considered the lion of the party. They pressed me to eat and to drink, and although I could not comply with their wishes to the fullest extent, I did the

best I could to merit such kindness and politeness. But I shall not attempt a description of a Chinese dinner which, like the dinner itself, would be necessarily a long one, and will only say that, like all good things, it came to an end at last, and Mr. Wang having finished his in the kitchen and taken a supply in his pockets, declared himself ready for my service.

Our road led us up to the head of the valley in which the temple stands, and then it seemed as if all further passage was stopped by high mountain barriers. As we got nearer, however, I observed a path winding up round the mountain, and by this road we reached the top of a range of mountains fully a thousand feet higher than any we had passed, or 4000 feet above the sea. When we reached the top the view that met our eyes on all sides rewarded us richly for all the toil of the morning. I had seen nothing so grand as this since my journey across the Bohea mountains. On all sides, in whichever direction I looked, nothing was seen but mountains of various heights and forms, reminding one of the waves of a stormy sea. Far below us, in various directions, appeared richly cultivated and well wooded valleys; but they seemed so far off, and in some places the hills were so precipitous, that it made me giddy to look down. On the top where we were there was nothing but stunted brushwood, but, here and there, where the slopes were gentle, I observed a thatched hut and some spots of culti-

vation. At this height I met with some lycopods, gentians, and other plants not observed at a lower elevation. I also found a hydrangea in a leafless state, which may turn out a new species, and which I have introduced to Europe. If it proves to be an ornamental species it will probably prove quite hardy in England.

We had left the highest point of the mountain ridge, and were gradually descending, when on rounding a point I observed at a distance a sloping hill covered with the beautiful object of our search—the *Abies Kæmpferi*. Many of the trees were young, and all had apparently been planted by man; at least, so far as I could observe, they had nothing of a natural forest character about them. One tree in particular seemed the queen of the forest, from its great size and beauty, and to that we bent our steps. It was standing all alone, measured 8 feet in circumference, was fully 130 feet high, and its lower branches were nearly touching the ground. The lower branches had assumed a flat and horizontal form, and came out almost at right angles with the stem, but the upper part of the tree was of a conical shape, resembling more a larch than a cedar of Lebanon. But there were no cones even on this or on any of the others, although the natives informed us they had been loaded with them on the previous year. I had, therefore, to content myself with digging up a few self-sown young plants which grew near it; these were afterwards planted in

Ward's cases and sent to England, where they arrived in good condition.

I now parted from my friend Mr. Wang, who returned to his mountain home at Quan-ting, while I and my guide pursued our journey towards the temple at which I was staying by a different route from that by which we had come. The road led us through the same kind of scenery which I have endeavoured to describe—mountains; nothing but mountains, deep valleys, and granite and clay-slate rocks—now bleak and barren, and now richly covered with forests chiefly consisting of oaks and pines. We arrived at the monastery just as it was getting dark. My friends, the priests, were waiting at the entrance, and anxiously inquired what success had attended us during the day. I told them the trees at Quan-ting were just like their own—destitute of cones. "Ah!" said they, for my consolation, "next year there will be plenty."

I cannot agree with Dr. Lindley in calling this an *Abies*, unless cedars and larches are also referred to the same genus. It is apparently a plant exactly intermediate between the cedar and larch; that is, it has deciduous scales like the cedar and deciduous leaves like the larch, and a habit somewhat of the one and somewhat of the other. However, it is a noble tree; it produces excellent timber, will be very ornamental in park scenery, and I have no doubt will prove perfectly hardy in England.

I had been more successful in procuring supplies of tea and other seeds and plants for the Himalayas than I had been in my search for the seeds of the new tree just noticed. Large supplies had been got together at Ningpo at various times during the summer and autumn, and these were now ready to be packed and shipped for India. For this purpose it was necessary to proceed to Shanghae; but to get there in safety was no easy matter at this time, owing to the numerous bands of pirates which were then infesting the coasts. The Chinese navy either would not, or perhaps it would be more correct to say they durst not, make the attempt to put them down. Hence, while these lawless gentry were ravaging the coast, the brave Chinese admirals and captains were lying quietly at anchor in the rivers and other safe places where the pirates did not care to show themselves.

In going up and down this dangerous coast I was greatly indebted to Mr. Percival, the managing partner of Messrs. Jardine Matheson and Co.'s house at Shanghae, and to Mr. Patridge, who had the charge of the business of that house at Ningpo. By their kindness I was always at liberty to take a passage in the "Erin," a boat kept constantly running up and down in order to keep up the communication between the two ports. This boat was well manned and armed, and, moreover, she was the fastest which sailed out of Ningpo. The Chinese pirates knew her well:

they also knew that her crew would fight, and that they had the means to do so, and although she often carried a cargo of great value, I never knew of her being really attacked, although she was frequently threatened.

On this occasion, as usual, I availed myself of Mr. Patridge's kindness, and had all my collections put on board of the "Erin." My fellow-passengers were the Rev. John Hobson, the Shanghae chaplain, and family, and the Rev. Mr. Burdon, of the Church Missionary Society, who had also secured passages in the "Erin" in order to escape falling into the hands of the pirates.

Leaving Ningpo at daybreak, with the ebb-tide and a fair wind, we sailed rapidly down the river, and in three hours we were off the fort of Chinhae, where the river falls into the sea. As we passed Chinhae anchorage a number of boats got up their anchors and stood out to sea along with us, probably with the view of protecting each other, and getting that protection from the "Erin" which her presence afforded. When we had got well out of the river, and opened up the northern passage, a sight was presented to view which was well calculated to excite alarm for our safety. Several piratical lorchas and junks were blockading the passage between the mainland and Silver Island, and seizing every vessel that attempted to pass in or out of the river. These vessels were armed to the teeth, and manned with as great a set of rascals as could be found on the coast of China.

These lawless hordes went to work in the following manner. They concealed themselves behind the islands or headlands until the unfortunate junk or boat they determined to pounce upon had got almost abreast of them, and too far to put about and get out of their way. They then stood boldly out and fired into her in order to bring her to; at the same time hooting and yelling like demons as they are. The unfortunate vessel sees her position when too late; in the most of instances resistance is not attempted, and she becomes an easy prize. If resistance has not been made, and no lives lost to the pirate, the captain and crew of the captured vessel are treated kindly, although they are generally plundered of everything in their possession to which the pirates take a fancy.

The *jan-dows*, as the pirates are called, have their dens in out-of-the-way anchorages amongst the islands, and to these places they take their unfortunate prizes, either to be plundered or to be ransomed for large sums by their owners at Ningpo, according to circumstances. Negociations are immediately commenced; messengers pass to and fro between the outlaws at the piratical stations, only a few miles from the mouth of the river, and the rich ship-owners at Ningpo; and these negociations are sometimes carried on for weeks ere a satisfactory arrangement can be made between the parties concerned. And it will scarcely be credited —but it is true nevertheless—that within a few miles from where these pirates with their prizes are

at anchor there are numerous Chinese "men-of-war" (!) manned and armed for the service of their country.

Many of the boats which had weighed anchor as we passed Chinghae put about and went back to their anchorage. The little "Erin," however, with several others, stood boldly onwards in the direction of the piratical fleet, and were soon in the midst of it. At this time some of them were engaged in capturing a Shantung junk which had fallen into the trap they had laid for her. We were so near some of the others that I could distinctly see the features of the men, and what they were doing on the decks of their vessels. They seemed to be watching us very narrowly, and in one vessel the crew were getting their guns to bear upon our boat. They were perfectly quiet, however; no hooting or yelling was heard, and as these are the usual preludes to an attack it was just possible they were prepared to act on the defensive only.

The whole scene was in the highest degree exciting; their guns were manned, the torch was ready to be applied to the touchhole, and any moment we might be saluted with a cannon-ball or a shower of grape. Our gallant little boat, however, kept on her way, nor deviated in the slightest degree from her proper course. The steersman stood fast to the helm, the master—Andrew, a brave Swede—walked on the top of the house which was built over three-parts of the

deck, and the passengers crowded the deck in front of the house. Every eye was fixed upon the motions of the pirates.

When our excitement was at the highest pitch the pirates hoisted a signal, which was a welcome sight to our crew, and although I have, perhaps, as much bravery as the generality of people, I confess it was a welcome sight to myself. The signal which produced such results was neither more nor less than a Chinaman's jacket hoisted in the rigging. I believe any other article of clothing would do equally well. It will not be found in Marryat's code, but its meaning is, "Let us alone and we will let you." This amicable arrangement was readily agreed to; a jacket was hoisted in our rigging as a friendly reply to the pirates, and we passed through their lines unharmed.

During the time they were in sight we observed several vessels from the north fall into their hands. They were in such numbers, and their plans were so well laid, that nothing that passed in daylight could possibly escape. Long after we had lost sight of their vessels we saw and pitied the unsuspecting northern junks running down with a fair wind and all sail into the trap which had been prepared for them.

We experienced head-winds nearly the whole way, and, consequently, made a long passage, and had frequently to anchor. I rather think Andrew attributed this luck to the two clergymen we had

on board; but if he did he may be excused, for wiser heads than his have had their prejudices on this point. Whatever luck we had as regards the weather we were certainly most fortunate in getting so well out of the hands of the pirates, and in fairness this ought to be taken into consideration.

CHAPTER XIV.

Season's collections shipped for India — Ancient porcelain vase — Chinese dealers — Joined by two friends — Inland journey — City of Yu-yaou — Fine rice district — Appearance and conduct of natives — Laughable occurrence with an avaricious boatman — Soil and rocks of district — Village of Ne-ka-loo and Chinese inn — Shores of the bay of Hang-chow — Salt and its manufacture — Curious moonlight journey — Rapid tides — Passage junk — Voyage across the bay — Chinese sailors — Arrive at Kan-poo.

DURING the succeeding winter and spring months I was engaged in packing and dispatching to India and Europe the numerous collections of plants, seeds, and other objects of natural history which I had formed in the summer and autumn. Large quantities of implements used in the manufacture of tea were also sent to India at this time, destined for the government plantations in the Himalayas and Punjab. I had been unceasing in my endeavours to procure some first-rate black-tea makers from the best districts in the interior of the provinces of Fokien and Kiangse, but up to this time I had not succeeded. This was by far the most difficult part of my mission, but as the services of such men were absolutely necessary in order to carry on the great tea experiment which the government of India had in hand, I determined not to leave China until I had accomplished the

object in view. As all the details concerning tea-plants, implements, and manufactures, may not have the same interest to the reader as they had to myself I shall skip a few pages of my journal and go on to where the narrative is more interesting.

In the month of April, 1855, I paid another visit to the old city of Tse-kee. My boat was moored in a canal near the north gate of the city, and I had been a prisoner for several days on account of a heavy and continuous fall of rain. One morning, soon after daylight, and before the boatmen or my servants were out of bed, a Chinese merchant, who made a living by selling old books and curiosities, paid me a visit, and informed me he had an ancient porcelain vase for sale which was well worthy of my attention. The heavy rain was beating on the roof of the boat, which prevented me from having the politeness to open it and ask the man inside. I therefore opened the little sliding window and called out that I would pay him a visit when fine weather came. This proceeding, however, would not satisfy him, and he insisted that I should go with him at once. To encourage me he pointed to his large Chinese boots studded with heavy nails, and said if I had a pair of them to put on they would protect me from the wet and mud in the streets. I had nothing of the kind, but as I had been making from time to time large collections of ancient porcelain vases and other works of art of an early period, I felt a

strong inclination to see this one, and therefore consented to accompany him to his house. On the way the rain fell in torrents; many parts of the streets were ankle deep in water, and as the houses are not furnished with gutters, as with us, to carry off the rain, it pours down upon the head of the unlucky passenger without mercy.

When we reached the house my conductor called out to his wife to bring me some warm tea, and as I was sipping this he produced his vase. It was a beautiful specimen of its kind, very fine in form, of a blue colour, and richly enamelled with houses, flowers, and Chinese characters, in gold. It was no doubt ancient, and quite perfect. The Chinese as a people are first-rate physiognomists: they can tell at a glance whether their wares take one's fancy, and vary their prices accordingly. I had long been accustomed to this, and invariably in my dealings with them tried to prevent them from reading any admiration or anxiety in my countenance when I intended to buy. When the vase in question was exposed to my admiring gaze its owner gazed intently into my face and asked me in a triumphant manner what I thought of it? I told him it was pretty good, and perfect, but that it was too large for me, and then asked in a careless way what its value was. He hesitated for some few seconds, evidently not quite certain what sum to name; at last he said that the true price was eighty dollars, but that if I wanted it he would let me have it for sixty—a sum equal to about 20*l*.

according to the rate of exchange at the time. Being a pretty good judge of the value of such things I knew the price asked was absurd, and did not make him an offer, although he pressed me very hard to do this. At the same time I had made up my mind to have the vase. The vendors of these ancient works of art in China have rarely any fixed price, and will not scruple to ask ten times the true value, which, if they are lucky enough to get, they do not scruple to laugh at the simpleton who gives it.

On my way back to my boat a man came up to me in the street and, greatly to my surprise, put a pencil note into my hand. This was from two friends, Messrs. Walkinshaw and Smith, who had found out on their arrival in the province that I was sojourning near Tse-kee, and had determined to join me for the sake of seeing a little of the country. As Mr. Walkinshaw had a good collection of ancient vases, and was almost as fond of collecting as I was, he expressed a wish to see the one I have just been describing. When the rain cleared off we went into the city and called upon my friend of the morning. The vase was again produced, and was much admired by Mr. Walkinshaw. We could not succeed in inducing its owner to part with it at the time, but some months afterwards I bought it for nine dollars, and it now adorns Mr. Walkinshaw's drawing-room in Canton; or rather it did so some time ago.

Having nothing more to do in the Ningpo dis-

trict until the autumn I determined to pay a visit to the great silk country of Hoo-chow, and to the hills on the western side of the plain of the Yang-tse-kiang, a country which was entirely new to me. My two friends had employed their time well during the few days they had to spare about Ningpo. They had visited the snowy valley and waterfalls, and various other places of interest which I have already noticed in these pages, and they were now ready to go northward to Shanghae.

In leaving Ningpo for Shanghae we determined to take the inland route, *via* Kan-poo (or Cam-poo), a town situated on the shores of the bay of Hang-chow, and about midway between that city and the seaport of Chapoo. Having engaged boats we left Ningpo with the first of the flood-tide and proceeded up the northern branch of the river in the direction of the ancient city of Yu-yaou.

In our passage up the river there was nothing seen worthy of particular notice. We were favoured with a fair wind between Ningpo and Yu-yaou, and reached that city in about twenty-four hours from the time of starting. As our boatmen expected to be paid back-fare, and as that fare would be allowed them for the same number of days taken to accomplish our journey, they had no interest in getting quickly onward. On the contrary, they looked on the fair wind we had experienced as a great misfortune. We reached Yu-yaou several hours before nightfall, but our boatmen having evidently made up their minds to stay

there for the night objected to proceed onwards. They gave as a reason that night was coming on, and they did not know the way after dark. Unfortunately for their logic it was only about four o'clock in the afternoon, and, consequently, we had four hours of daylight before us. I therefore told them that what they said might be perfectly true—I doubted it myself—yet we could go on until it became dark and then we would stop for the night. To this they demurred for some time, but eventually, by coaxing and threatening, they were induced to proceed onwards.

Previous to this discussion we had landed and paid a visit to the city. It consists of two portions, or rather there are two cities, one on the south side of the river and the other on the north. The city on the south side appears to be very ancient, and is now in ruins; its walls are broken down and covered with weeds and brushwood. The one on the north side, although old, is of a more modern date, and appeared to be in a flourishing condition. Its walls enclose a hill about 300 feet in height, on which there is a temple dedicated to a minister of state who flourished in the Ming dynasty. In as far as I know, the city is not famous for anything particular in the arts, and we saw nothing of importance as we passed through its streets.

After passing the city our boats left the main stream and turned into a canal on its left bank. When we had proceeded a few miles along the

canal we came to another on a higher level, and had our boats drawn up an inclined plane by means of two rude windlasses. Here a fresh difficulty awaited us. This canal was so full, owing to the late rains, that our boats could not pass under the bridges without having the roofs taken off. As it was now nearly dark, we made up our minds to remain here for the night, and make a fresh start early next morning.

The natives in the surrounding villages now came flocking to our boats in great numbers. They seemed a more respectable set than most of the country Chinese with whom I have been in the habit of mixing. They were well clothed, apparently well fed, and had a cleanly appearance about them, which, it must be confessed, is rather rare in country districts in China. Their houses, too, were large and well-built; many of them were neatly whitewashed with lime, and had a sort of comfortable look about them which expressed in language unmistakeable that their owners were "well to do in the world."

In this part of the country the staple article of summer-cultivation was rice. The land seemed exceedingly fertile, and this no doubt had something to do with the well-being of the inhabitants. I have observed this frequently exhibited in a most marked manner in China. Wherever the country is fertile, or when it produces an article of great value in commerce, such as silk or tea for example, there the natives as a general rule have more com-

fortable houses, are better fed and better clothed than they are in other places. In those bleak and barren mountain-districts, both inland and on the seacoast, where the land yields barely a remunerative crop, the natives are generally ragged and dirty in appearance, while their dwellings are mean hovels which scarcely afford protection from the inclemency of the weather.

The manners of the people we were now amongst were quite in keeping with their outward appearance. As they crowded round our boats they were exceedingly polite and courteous, and gave us any information we required as to our journey through the country, and the state of the canals and bridges.

It was now past seven o'clock in the evening, and dinner being ready we sat down to enjoy our evening meal. This proceeding seemed highly interesting to our Chinese visitors, who now crowded round our boat and were peeping through every crevice where a view of what was going on within could be obtained. They were, no doubt, quite as much surprised at the operation of eating with knives and forks as country-people at home would be if they saw a Chinese family sit down with their chop-sticks.

The Chinese are early in their habits—they go to bed early and rise early in the morning—so we were soon left by the crowd which surrounded our boats, to enjoy our dinner in peace and quietness. At daybreak on the following morning we took

our provisions and baggage out of the largest boat, which could not pass under the bridge, and discharged it. Here a laughable occurrence took place which I must notice. One of the men belonging to the boat was an old man, very obstinate and rather despotic in his bearing both to the other boatmen and to ourselves. In China an old man has great privileges in this respect. He can do many things which a younger man must not attempt, and is generally looked up to and humoured in many of his foibles. Now it so happened that this old man had made up his mind to be as long as possible on our upward journey, in order that he might have the same allowance of time and money for his journey back to Ningpo, and it was he who had given us so much trouble at Yu-yoau. But fair winds and other circumstances had disappointed him, and instead of spending about three days in bringing us thus far, he had been only one day and two nights. As we had been one of these nights lying at the bridge, and as his way back was down stream, we calculated that he would easily reach Ningpo in a day and night, even if the wind was contrary. He was therefore paid for three days in full, which appeared to us to be most ample. But this did not satisfy the old man; he had calculated on being six days in our service, and six days' pay he was determined to have, nor would he listen to reason or any explanation.

We had borrowed a table and three chairs from

Mr. Wadman in Ningpo, and had promised to send them back in the old man's boat, in which they had been used. These he threatened to sell to make up the amount—a mode of proceeding which I well knew he durst not adopt. We then bade him good-bye, and with the money which he had refused we proceeded on our journey in the smaller boats.

We had not gone very far when our friend made his appearance,—having come by a near cut across country,—and begged in the humblest manner that we would let him have his money. He was quite satisfied now, and he "would not sell the chairs." As a slight punishment, we paid no attention to his request for some time, and allowed him to follow the boats for about a mile. We then paid him the sum which he had formerly refused, and added for his consolation that had he taken it at first he would have received a present besides—a lesson which, if it was lost on him, had a good effect on our other men.

As we proceeded the canal became fuller, and my boat, which was the next largest, was stopped by a bridge. There was nothing for it but taking out all my luggage, and sending it onwards in a small sand-pan, which luckily was easily procured. My boatmen were quite satisfied with the allowance made to them for their homeward journey, and wished me fair winds and a prosperous journey, adding that if I returned to Ningpo they would be happy to have a fresh engagement.

As we were only a few miles distant from the end of the canal—a place called Ne-ka-loo—we sent the boats on, and determined to walk across the country ourselves. On our way we passed through a large village named Te-sye-mun, remarkable for a neat and well-finished mausoleum erected in the dynasty of the Mings for a minister of state—the same, I believe, to whom the temple is dedicated on the hill inside of the city of Yu-yaou.

The low country through which we passed had the same rich appearance which I have already mentioned, but the hills, which seemed jutting into it in all directions, were comparatively barren. They were chiefly composed of porphyritic granite mixed with crystals of quartz of a very coarse description.

About midday we arrived at the little village of Ne-ka-loo, which is situated on the shores of the bay of Hang-chow, and took up our quarters in a Chinese inn. Our landlord seemed a bustling, good sort of a man, and did everything in his power to make us comfortable. He informed us the passage-junks by which we had to cross the bay had not arrived from Kan-poo, but would probably make their appearance in the afternoon, and if we would agree to pay six dollars we could have a junk to ourselves, and could start to cross the bay at eleven o'clock that night, when the flood-tide came in. Assenting to this arrangement, we left our servants to prepare an early dinner in

" our inn," and went down to make an inspection of the shores of the bay.

Between the village of Ne-ka-loo and the bay there is a wide mud-flat, three or four miles in extent, having several wide and substantial embankments stretching across it and running parallel with the bay. It appeared as if the bay had been much wider at some former period than it is at the present day. Large portions of land have been from time to time reclaimed from the sea, and the embankment furthest inland is now a long way from the shore. Outside of this the land is now under cultivation, and annually yields heavy crops of grain. As we approached nearer to the bay, we observed the flats covered with a white crystalline substance, which on a nearer view proved to be salt. Here there is but little vegetation of any kind, and the whole face of the country presents a most barren aspect.

Salt is made in large quantities all along the shores of the bay in the following manner :—A thin layer of the surface-soil is raked up, loosened, and then saturated with sea-water. As the water evaporates, the operation is repeated several times in succession until the clay or mud has absorbed as much salt as it is capable of doing. This salt-clay is then collected together into large round mounds, and this part of the process is finished. The second part of the process consists in separating the salt from the mud. This is done by throwing the latter on the top of a rude filter, and

pouring water over it. The water takes the salt out of the mud and carries it down through the filter into a hole below. Sometimes the mud is stamped upon by the feet of the workmen in order to remove the whole of the saline particles with which it is mixed.

When the salt has been removed in this way from the mud, the latter is thrown out of the filter and dried, in order to act in the same way again. The brine when it has passed through the filter into the well below is perfectly clear, and of course highly saline. In this state it is taken out of the well and conveyed in bullock-carts to the place where it is to be boiled. Here it is poured into large square boilers with bamboo frames covering the surface of the liquid. On these frames the salt adheres as it crystallizes.

Large quantities are also made without the aid of fire or the boiling-house. The saline mixture described above is poured thinly into shallow wooden trays, and in this state exposed to the sun. If the day is hot the water soon evaporates and leaves the salt with which it was mixed at the bottom of the trays. The salt made by boiling or by evaporation in the sun does not seem to undergo any mode of purifying as with us, but in this rough state is put into baskets and carried to the market.

Salt is a government monopoly in China. All the land here, with the salt-mounds, boiling-houses, &c., belongs to the government. Everywhere,

however, along these flats, and in many parts of the sea-coast, a large smuggling trade is carried on under the eye of the authorities, who do not seem to interfere, or only now and then.

While engaged in making these investigations a Chinese sailor came running towards us from the shore, and informed us that the passage-junk had arrived. Her captain had been obliged to anchor a considerable way out for want of water, but would come close in-shore when the flood-tide made in the evening. We therefore returned at once to our inn in order to have dinner and to make preparations for our voyage across the bay. In the mean time our landlord had got together a number of coolies and three chairs to carry us and our luggage across the flats.

About eight o'clock in the evening we left the inn, and took our way to the junk. It was a fine moonlight night, and every object around us was sparkling as if covered with gems. The chairs in which we performed this part of the journey were the most uncomfortable things of the kind I had ever been in. The bearers, instead of slipping along in that easy way in which such persons generally go, jogged along like two rough buffaloes. As we proceeded the country had a most curious appearance by moonlight. Soon after leaving the village there was scarcely a tree to be seen, and after passing the second embankment vegetation — except some salt-loving plants — entirely disappeared. Everywhere the ground was

whitened with a coating of salt, and had a most wintery look about it; indeed had it not been for the soft and warm air which fanned us as we went along, and reminded us of summer, it would have been no stretch of imagination to believe the ground was covered with snow.

The night was so beautifully clear, that we could see our long train of coolies a great way off, toiling along with our luggage towards the shores of the bay. Now and then one would break down and get left in the rear, and then he might be heard shouting to his companions to wait until he came up with them. Here and there we passed rude-looking bullock carts or waggons which are used to convey the salt-brine to the boiling-houses, and sometimes to carry passengers' luggage, or merchandize, from the junks to Ne-ka-loo. The whole scene reminded me forcibly of a journey across the isthmus of Suez, which I had made in a clear moonlight night such as this was.

As we neared the shore, the ground seemed much broken up by deep water-courses, caused no doubt by the rapid tides for which the bay is famed. The atmosphere, too, became thick with a kind of misty haze, so that we could see but a very short distance either before or behind. Our coolies were now heard shouting out to each other in order that they might keep together, which was a difficult matter in the circumstances in which we were placed. To me there did not seem to be a landmark of any kind to direct our course, al-

though, no doubt, our coolies, who were well accustomed to the road, saw with very different eyes. Those furthest ahead now began to shout loudly to the sailors in the junk, which was supposed to be somewhere near, but as yet not visible from the spot where we had halted. The signal was heard and replied to by the people on board, who seemed close at hand, and in another minute we were standing on the brink of the bay.

When we reached the water's edge we observed our junk aground a little below the spot where we stood, and were informed the flood-tide would make immediately, when she would be brought to the bank to receive us and our luggage. In a few minutes an extraordinary sound of rushing water was heard coming up the bay, and almost at the same moment the tide began to flow with a rapidity which was quite alarming. This was the "Eagre," or as it is called in India, the "Bore," which often makes its appearance on the Bay of Hang-chow at full and change of the moon, and is sometimes most dangerous to boats and junks which are caught in its full strength. In the present instance our junk was in a kind of creek, or at the mouth of a canal, and in this position was perfectly safe. She floated instantly and moved up to a position close to the bank on which we were standing. The sailors seemed to manage her admirably, and it certainly required both activity and experience to bring her up as they did. As soon as the vessel was in her proper position, she was kept in it

by two strong stakes—one near the bow, and the other near the stern—which went from the deck right through her keel. These stakes by their own weight fall firmly into the mud, and while they secure the vessel, at the same time they allow her to rise with the tide.

This mode of navigation, curious though it may seem at first sight, is very safe and almost indispensable where the tides run so rapidly. It will be observed that the vessel was at first aground on a mud-flat, which gradually rose towards the banks in the form of an inclined plane. As soon as the tide rose sufficiently to enable her to float, she was propelled in the proper direction by poling. If she grounded again before she made the bank, the stakes were let down, and she was secured for a second or two until she floated again. And so she was propelled forward, and kept in her position in this way, until the bank was reached, and she was finally secured. All this occupies less time than it takes to describe it, particularly during spring-tides; but if the sailors waited until they had plenty of water to carry them inshore at once, in many instances the force of the flowing tide would render the junk unmanageable, and carry her right up the bay.

When the junk had been brought into her proper position alongside the bank where we were standing, she was secured by strong cables made fast at stem and stern, and then tied to wooden stakes which were driven firmly into the bank

on the water's edge. She was now considered secure, and able to withstand the strong rush of water which seemed to be carrying everything before it.

Before these preparations were completed the tide was rushing up the bay with fearful rapidity, and rising much faster than I had ever witnessed before. In less than a quarter of an hour it rose some fourteen or fifteen feet, and seemed as if it would soon overflow the banks and cover the low-land on which we were standing. At the same time it poured its water into the creeks and ditches which its former violence had torn open, and every now and then we could hear the dull, heavy sound of mud-banks tumbling into the stream. Although there was no danger when we were standing still, we felt glad when the junk had been properly moored so that we could get on board.

The junks which navigate this dangerous bay are generally loaded with pigs when coming from the north side, and consequently are frequently in a most filthy condition. Dr. Medhurst, of the London Missionary Society at Shanghae, gives the following graphic description of what he experienced when crossing in a pig-laden junk:—

"It was night before we arrived on board the junk, which immediately got under weigh. It was only then that we became alive to our uncomfortable position. The grunting and stink of the pigs, together with the smoking and jabbering of the men, affected a variety of the senses in a most

disagreeable manner. We found the berths that had been assigned us already occupied by about a dozen individuals, but upon remonstrance made we got one of the berths cleared for our reception, in which we had to make our beds, immediately under the pigs, and in close contiguity to a dozen Chinamen, who lay about on the floor one over the other, almost as filthy and unceremonious as the pigs themselves. The stench and heat was almost unsupportable, and the horrid groaning and struggling of the porcine multitude over head, rendered sleep almost impossible. To increase our troubles we had a contrary wind, and as the navigation of the Tsëen-tang (owing to the tides in the Bay of Hang-chow altering the position of the sands almost every day) is at all times difficult, we had the additional pleasantness of a probable shipwreck in a windy night, without a single boat in which we could have reached the shore. By God's good providence, however, we were preserved during the night, and in the morning found ourselves only a few miles from the place where we embarked, with the wind right ahead. By dint of great exertion in skulling, the boatmen brought the vessel to the south side of the bay about midday. By this time we found that the tide was just ebbing, which caused our vessel to ground far from land, and made it necessary for us to wait until the tide had run all out and made again, before we could get at all nearer the shore. In the mean time we sent a man to wade through

the mud and water, in order to call a couple of chairs and coolies to convey us and our baggage across the mud-flats to Ne-ka-loo."

Having engaged the junk for ourselves, we were not quite so badly off as our missionary friends, and had no pigs to annoy us. When we got on board we went below to see the berths in the cabin which were set apart for our accommodation, but they appeared so filthy and stunk so horridly that we were glad to get on deck again. The cabin was also full of smoke, and everything we came in contact with left its mark on our hands or our clothes. It was now determined to have our beds spread down on the deck of the vessel, where, as it was partly covered, we could sleep with more comfort than in the filthy cabin.

We weighed anchor, or rather we "cast off" about midnight, and stood across the bay. The wind was light and fair, the water was perfectly smooth, and everything seemed to promise a safe and speedy passage. As this part of the bay was sometimes frequented by numerous small piratical craft, I was doubtful about going to sleep, but the boatmen assured me there was no fear from an attack at this time, and as these people are exceedingly timid an assurance of this kind from them was deemed satisfactory.

For some time after we were under way I sat on the foredeck of the vessel contemplating the beauty and stillness of the scene around me. The

moon was shining dimly through a thick haze, not a sound was heard, except now and then a sail flapping against the mast and the rippling noise which the water made against the bows. Notwithstanding the beauty and stillness of the scene around me I soon began to feel very sleepy, and went and lay down on my couch. How long I had slept I know not, but I was suddenly awakened by being pitched bed and all to the lea side of the deck, when I was brought up by the bulwarks, a part of which were under water. It was now "all hands in-sail." The scene had undergone a complete and it appeared a rapid change; the moon had set; it was now dark and blowing half a gale, and the waters of the bay which were so smooth a few hours before were now rolling along in deep waves capped with foam.

On account of the numerous sand-banks and rocks and rapid tides in this bay, its navigation at all times is exceedingly dangerous if the vessels are driven but a short way out of the proper course. But the Chinese are excellent sailors on their own coasts and in their own vessels. On the present occasion the helm was instantly put down, and the vessel came up to the wind. The crew then ran forward to the masts, the sails were lowered and reefed, and we kept our course again. The sails had to be reduced from time to time as the wind freshened; but as it was fair we were flying through the water with great rapidity, and had the satisfaction of knowing that we should be

soon across the bay. As we approached the northern shores we got under the shelter of the land, and the sea became perfectly smooth.

The distance across the bay at this point is about twenty miles, and this we accomplished in about three hours. At daylight in the morning we found ourselves "high and dry" in the mud alongside of several other trading junks, which, like ourselves, had run in here at high-water. We crossed the mud-flat between the vessel and the shore on men's shoulders,—a fine, stout fellow carried me and deposited me dry and safely on the sands—and then walked on to the ancient city of Kan-poo, which we found situated about a mile from the beach.

CHAPTER XV.

The Tsien-tang river — Its eagre or "bore" — Appearance it presents — Effects it produces — Superstitions of the natives — City of Kan-poo — Mentioned by Marco Polo — Its decay as a maritime port — Another source of wealth — Its inhabitants — Village of Luh-le-heen — Engage canal boats — Pass through borders of silk country — City of Yuen-hwa — Supposed emporium for "*Yuen-fa*" silk — Geology of isolated hills — City of Ping-hoo — Way to manage Chinese crowds — Shops and gardens — A dangerous position — Arrive at Shanghae.

THE Tsien-tang river, which flows past the city of Hang-chow-foo and empties itself into the bay we had just crossed, is formed of two branches, which unite at the old town of Yen-chow, about one hundred and twenty miles from its mouth. The more southerly branch has its numerous sources amongst the mountains bordering on Fokien, and amongst some hills north-west of the town of Chang-shan, where the three provinces of Chekiang, Kiangse, and Gnan-hwuy meet. The other branch rises in the north-west, amongst the green-tea hills of Hwuy-chow. On former occasions * I had journeyed to the source of both these branches, and found them navigable for country flat-bottomed boats for upwards of two hundred miles from Hang-chow. These boats bring down all the tea

* See 'Journey to the Tea Countries of China and India.'

and other articles produced amongst these inland provinces to Hang-chow, where they are transferred to boats of another class on the canals. Owing to the numerous rocks, sandbanks, and rapid tides eastward of the city, the lower part of the river and head of the estuary is rarely trusted by vessels of any class, large or small. Everything is sent onward by the canals, which here form a network all over the vast plain of the Yang-tze-kiang.

The Eagre, or as it is called in India, the "Bore" of the Tsien-tang river is famous in Chinese history. It is one of the three wonders of the world, according to a Chinese proverb, the other two being the demons at Tang-chau and the thunder at Lung-chau. As in other countries, the Eagre makes its appearance generally on the second or third day after the full or change of the moon, or at what are called "spring tides," and particularly in spring and autumn, about the time the sun is crossing the line. Should it so happen that strong easterly gales blow at these times the Eagre rolls along in all its grandeur, and carries everything before it. Dr. Macgowan, the well-known medical missionary at Ningpo, gives the following graphic account of it which he witnessed during a visit to Hang-chow-foo.

"Between the river and the city walls, which are a mile distant, dense suburbs extend for several miles along the banks. As the hour of flood-tide approached crowds gathered in the streets running

at right angles with the Tsien-tang, but at safe distances. My position was a terrace in front of the *Tri-wave* temple, which afforded a good view of the entire scene. On a sudden all traffic in the thronged mart was suspended; porters cleared the front street of every description of merchandise, boatmen ceased lading and unlading their vessels, and put out into the middle of the stream, so that a few minutes sufficed to give a deserted appearance to the busiest part of one of the busiest cities in Asia. The centre of the river teemed with craft, from small boats to large barges, including the gay 'flower-boats.' Loud shouting from the fleet announced the appearance of the flood, which seemed like a glistening white cable stretched athwart the river at its mouth, as far down as the eye could reach. Its noise, compared by Chinese poets to that of thunder, speedily drowned that of the boatmen, and as it advanced with prodigious velocity—at the rate, I should judge, of twenty-five miles an hour—it assumed the appearance of an alabaster wall, or rather of a cataract four or five miles across and about thirty feet high, moving bodily onward. Soon it reached the advanced guard of the immense assemblage of vessels awaiting its approach. Knowing that the Bore of the Hoogly, which scarce deserved mention in connection with the one before me, invariably overturned boats which were not skilfully managed, I could not but feel apprehensive for the lives of the floating multitude. As the foaming wall of water

dashed impetuously onwards they were silenced, all being intently occupied in keeping their prows towards the wave which threatened to submerge everything afloat: but they all vaulted, as it were, to the summit with perfect safety. The spectacle was of greatest interest when the Eagre had passed about half-way among the craft. On one side they were quietly reposing on the surface of the unruffled stream, while those on the nether portion were pitching and heaving in tumultuous confusion on the flood; others were scaling, with the agility of salmon, the formidable cascade.

"This grand and exciting scene was but of a moment's duration; it passed up the river in an instant; but from this point with gradually diminishing force, size, and velocity, until it ceased to be perceptible, which Chinese accounts represent to be eighty miles distant from the city. From ebb to flood-tide the change was almost instantaneous. A slight flood continued after the passage of the wave, but it soon began to ebb. Having lost my memoranda I am obliged to write from recollection: my impression is that the fall was about twenty feet; the Chinese say that the rise and fall is sometimes forty feet at Hang-chow. The maximum rise and fall at spring-tides is probably at the mouth of the river, or upper part of the bay, where the Eagre is hardly discoverable. In the Bay of Fundy, where the tides rush in with amazing velocity, there is at one place a rise of seventy feet, but there the magnificent

phenomenon in question does not appear to be known at all. It is not, therefore, where tides attain their greatest rapidity, or maximum rise and fall, that the wave is met with, but where a river and its estuary both present a peculiar configuration.

* * * * *

"A very short period elapsed between the passage of the Eagre and the resumption of traffic; the vessels were soon attached to the shore again, and women and children were occupied in gathering articles which the careless or unskilful had lost in the aquatic mêlée. The streets were drenched with spray, and a considerable volume of water splashed over the banks into the head of the grand canal, a few feet distant." *

Such is the appearance which is presented, and some of the effects which are produced by this tidal phenomenon. By the superstitious and ignorant among the natives it is accounted for in the following manner. One Wú-Tsz'-si, who lived about five hundred years before our era, had the misfortune to offend his sovereign, who politely made him a present of a sword, by which he understood he was to remove himself from the presence and from the world at the same time. When this object was accomplished his body was thrown into the Tsien-tang river, and afterwards became the god of the Eagre. His indignation and rage for such treatment while on earth is now

* Transactions of the China branch of the Royal Asiatic Society.

exhibited periodically by the violence of the tidal wave, which sweeps everything before it on its course, breaks down the river's banks, and floods the adjoining lands. Monarchs of almost every dynasty have honoured him with titles; temples have been erected to his memory; and prayers and sacrifices are periodically offered by the people in order to appease his anger.

At the entrance of the Bay of Hang-chow, or Chapoo, as it is sometimes called, although there is no Bore, the spring-tides are well known to navigators as very rapid and dangerous. Sir R. Collinson, when in the H. C. steamer "Phlegethon," trying to find a passage to Hang-chow-foo, found he had a tide running "eleven and a half knots when nineteen miles distant from the Chapoo hills and two from the shore. Traversing the river, which at this point is about fifteen miles wide, there was no continuous channel found, although there were some deep spots. When the 'Phlegethon' was exposed to this tide she had an anchor down with a whole cable (having previously lost an anchor and cable in endeavouring to hug up), was under her full power of steam with sails set, and was still driving."

On the north side of the Bay of Hang-chow the Yang-tze-kiang, one of the largest rivers in the world, empties itself into the ocean. Year by year it brings down large quantities of alluvial matter and deposits it at its mouth. While this annual deposit is in some places gradually and

rapidly rising and forming islands,* much of it is apparently swept by the rapid tides into the bay of Hang-chow, where it stops up the passages for navigation, makes former seaports into mere inland towns, and gives a new direction to the traffic of the country.

Kan-poo, the old city at which we had now arrived, is an example of what I have now stated. It is thought by some, and with pretty good reason, that this place is the same as that mentioned in Marco Polo's travels under the name of Kan-foo. In his day it was the seaport of Hang-chow-foo, and was frequented by ships from India and other parts of the world. Now the sands and alluvial deposit of the Yang-tze-kiang, and the rapid tides of the estuary, have destroyed its maritime importance, and instead of receiving ships freighted with the riches of India, and dispatching them full of the silk and other products of the country, it is an insignificant inland town with a few passage junks which keep up a communication with the opposite shore, whose principal articles of freight are Chinese passengers and pigs.

Kan-poo is between twenty and thirty miles to the eastward of Hang-chow-foo. Some fifty miles further east, and near the mouth of the bay, the city of Chapoo has sprung up into con-

* In 1843, when I first visited these parts, there was a sand-bank barely visible at high water. That is now covered with trees, inhabited, and forms an excellent mark to navigators.

siderable importance, and has taken the place of Kan-poo as the seaport of the provincial capital. But there is scarcely any foreign trade carried on at Chapoo. No ships bring "merchandise from India." It is chiefly remarkable for the large trade done in wood, brought up from the province of Fokien, and also as being the only port in the empire that trades with Japan.

It is just possible that long before the days of Marco Polo Hang-chow-foo itself was a seaport; then as the river gradually became unsafe Kan-poo sprang up, which in its turn again gave place to Chapoo. And it seems equally certain that in the course of time—that time may yet be far distant—if the depositions at the mouth of the bay continue, Chapoo itself will have to give way to some place nearer the sea.

The city of Kan-poo seems a very ancient place, judging from the appearance of its wall and ramparts. They are built of large square stones, much worn by time, and are rather in a dilapidated condition. Overgrown in many places with long grass, reeds, and brushwood, and much broken, they have a hoary look about them which insensibly carries the mind back to bygone ages, and to generations which have long since passed away. They appeared to be nearly three miles in circumference, but the space enclosed is not nearly covered with houses, and also includes many gardens and green fields. In our walks through the city we found it contained a number of clean re-

spectable-looking houses, but its streets reminded us of a quiet country-town, and had none of that bustling activity which is visible at a flourishing Chinese seaport.

Although the shifting sands and rapid tides of the estuary have long ago cut off communication with the sea, yet the old city has a mine of wealth within itself, which it is likely long to retain. It is situated on the border of a rich silk country, and large quantities of this valuable article are annually produced, both for home consumption and for export. The natives were now (June 1st) busily employed in reeling the first crop of coccoons. In almost every other house in some of the streets the clack, clack, clack, of the winding-machine fell upon our ears as we passed along. We frequently stopped to examine this part of the process, which will be found fully described in a subsequent chapter, if the reader condescends to accompany me through the centre of the great silk country to the silk-towns of Nan-tsin and Hoo-chow-foo. We did not observe any other articles of manufacture in Kan-poo worthy of notice. The natives seemed clean and comfortably-looking in their appearance, and treated us very civilly. We were not inconvenienced by those crowds of noisy vulgar-looking fellows who generally surround foreigners when they make their appearance in their inland towns.

In order to engage canal-boats to continue our journey we walked onward to a place named Luh-

le-heen, distant from Kan-poo between two and three miles. Here a canal terminates which is connected with those which ramify all over the plain of the Yan-tze-kiang, and here we found travelling-boats from all quarters of the country ready to be engaged. There is a canal which leads from the city to this point, and by this means we brought up our servants and luggage. At Luh-le-heen the two canals are separated by an embankment, and goods or luggage has to be carried across on men's shoulders.

Luh-le-heen is a small bustling village on the banks of the canal, chiefly remarkable for the number of tea-shops and other houses of refreshment it contains. Judging from the crowds of people we saw in these places, a thriving trade must be done by their proprietors; but it must be taken into consideration that most of their customers spend very small sums. In tea-shops in China a cup of tea can be had for about the third part of a farthing of our money, and oftentimes for less than that, so that a shop of this kind may be crowded from morning to evening and not a large sum of money taken after all during the day.

We found no difficulty in engaging boats to take us onwards to Shanghae, and having had our luggage carried into them over the embankment, we sculled away, and soon left the canal village far behind us. Our route now lay along the borders of the silk district, and everywhere we saw groves

of mulberry trees in cultivation in the fields. A few hours brought us to a large city, named Yuen-hwa, containing a population estimated at 100,000 persons. As this city is also on the borders of the great silk country, it is probably here where that description of silk called Yuen-fa is produced. This, however, is only conjecture, although probably a correct one. A few isolated hills were observed near this city which formed a boundary on the south to the immense alluvial plain which now stretched away far to the north and eastward from Yuen-hwa. The Rev. Dr. Medhurst, when on a missionary tour, examined these hills, and states they are composed of a "red kind of igneous rock, mixed with large portions of quartz. It seemed to be a schistose formation of disintegrated granite combined with porphyry."

In the afternoon of the following day after we had left Yuen-hwa, we arrived off the city of Ping-hoo, having called in by Chapoo, a town which my two friends were anxious to see. Although Ping-hoo is not a very great distance from Shanghae, it does not seem to have been often visited by foreigners, and the people are very wild and unruly. This is, no doubt, partly owing to the large boat-population which the place contains, being situated on the bank of a central canal, which communicates with all parts of the country. Having determined to visit the place in passing, in order to endeavour to make some purchases of articles of *virtu*, and to visit some nursery gardens

near the west gate, I warned my friends of the unruly mob which we would probably find outside the walls, and begged them to endeavour, if possible, not to lose temper. There is nothing more dangerous than losing one's temper with a Chinese rabble. Keep in good humour, laugh and joke with them, and all will go on well; they may be noisy and boisterous in their mirth, but generally they will do nothing further to annoy you; but once lose temper, and show that you are angry either by word or deed, and ten to one you will soon find yourself in a dangerous position. There are more than one whom business or other matters has made a sojourner in the Celestial Empire, who can bear witness to the truth of this statement.

When we landed from our boats a large crowd collected around us and followed us into the city, increasing as we went along. Every now and then a little urchin ran past to give warning on ahead, so that we found the whole street aware of our approach, and every door and window crowded with anxious faces. All went on quite well, however, although the crowd contained some mischievous-looking fellows in its ranks. When we entered a shop the scene outside was quite fearful. The street was very narrow and literally crammed with human beings, all anxious to see us and to find out what we were buying. In more than one instance the pressure was so great as to endanger the fronts of the shops; and, anxious as the

Chinese are for trade, I believe the poor shopkeepers were heartily glad when they got rid of us. We picked up two or three interesting specimens of ancient porcelain, and, had time and the crowd permitted, we would have got many more. We had entered the city at the east gate, near the canal, and as its main street runs from the east to the west gate, we proceeded in the direction of the latter. Its shops are but poor in general, and as a city I believe it is not remarkable for any particular branch of manufacture, but many retired wealthy people live within its walls.

Outside the west gate were the nursery gardens I was desirous of visiting. I had been here on more than one occasion formerly, but had generally avoided raising a crowd by coming round the moat which surrounds the city in my boat, and stepping out of it into the gardens unseen except by two or three persons. On these occasions, ere a crowd could gather, I had finished my business and was off. In the present instance, however, the dense mass of beings followed us closely, and went into the gardens along with us, to the great danger of numerous pretty flowers and flowerpots which stood in the way. All were, however, though boisterous, in perfect good humour, and, although we found it very annoying to be followed and crowded in this way wherever we went, and prevented from well examining the various things which came in our way, yet we bore with it as well as we could and took everything in good

part. Nothing new or rare being found in the gardens to reward us for the visit we had paid to them, and as it was getting late in the afternoon, we determined to return at once to our boats, from which we were distant about two miles. In order to get relieved from the crowd we did not again enter the city, but went back through its northern suburb in the direction of the east gate. This movement in a great measure accomplished the intended object, and most of the people who had followed us thus far, with the intention of returning with us through the city, left and went home. A small portion, however, continued to follow us until we came to the north gate, when I remonstrated with them by saying that surely they had seen enough of us, and that we were anxious to have a quiet walk after all the noise and inconvenience we had been subjected to. After this they seemed afraid to follow us any further, but we had soon reason to repent having stopped them. Our road led us for some distance close under the city walls. Two or three rascally-looking fellows, the scum of the crowd, entered by the north gate and got upon the top of the ramparts, and soon showed evil intentions towards us. Several stones were thrown by unseen hands, and from the position we were in, our situation was far from being an agreeable one. Hemmed in as we were by the city wall on one side and houses on the other, moreover the street thus formed being very narrow, we were placed entirely at the

mercy of our assailants. At last a large brick came tumbling down, and struck the ground close to our feet. It was well-aimed, and had it struck the mark it is probable that one of our little party would have been killed on the spot. We were perfectly powerless. We neither could see those by whom we were attacked, nor could we get out of their way. Several respectable Chinese remonstrated with their unruly countrymen, and we hurried onwards in order to get out of our awkward position as soon as we possibly could. Fortunately, we soon came to a cross-street which led away from the wall, and we were then out of danger.

We reached our boat without any further adventure, and were glad to push out into the stream, having had quite enough popularity for one day. Having described the country between Ping-hoo and Shanghae in a former work,* I need not say anything further about it here. A few hours brought us to the upper part of the Shanghae river, and we reached that city on the third of June, much pleased, on the whole, with our inland journey.

* 'Three Years' Wanderings in China.'

CHAPTER XVI.

Leave Shanghae for the silk country — Melancholy results of the Shanghae rebellion — Country and productions about Cading — Indigo and safflower — Bamboo paper-making — Insects — Lakes and marshy country — Visit the town of Nan-tsin in the silk districts — Its shops and inhabitants — Producers of raw silk and silk merchants — Description of silk country — Soil — Method of cultivating the mulberry — Valuable varieties — Increased by grafting and not by seeds — Method of gathering the leaves — Hills near Hoo-chow-foo — Temples and priests.

On the evening of the eighth of June I took my departure from Shanghae, en route for the great silk district for which the province is famed all over the world, and for the mountainous country which lies to the westward of the plain of the Yang-tse-kiang. As my boat proceeded rapidly up the Soochow branch of the river, I soon approached the ground where the imperialists had their principal camp during the siege of the city, and where so many hundreds of poor wretches were executed after the city was evacuated. It was a calm and beautiful evening. The sounds of civil warfare and of a camp teeming with barbarous soldiers, which had been so often heard a few months before, had now passed away,—the sword had been converted into the ploughshare—and the husbandman was quietly engaged in the

cultivation of his fields, now enriched with the blood and bodies of his countrymen.

As I passed the site of the old camp I sat on the outside of my boat smoking my cigar in the cool air of the evening, and musing upon the events of the preceding years. The wind at the time blew softly from the south, and before it reached the river on which I was sailing it had to pass over the site of the old encampment. The first puff that reached me almost made me sick, and it has nearly the same effect on me even now when I think of it as I write. Although I had seen none of the executions which had taken place a short time before, I did not require any one to inform me that this was the "field of blood." Here hundreds of headless bodies scarcely covered, or only with an inch or two of earth, lay in a state of decomposition, and the stench from them filled and polluted the air. Here, then, was the end of the Shanghae rebellion, which, at one time, was so much lauded and encouraged by foreigners at that port. The country was devastated for miles round, the city lay in ruins, thousands of the peaceful inhabitants were rendered homeless and friendless, and the authors of this state of things, who used to strut about dressed in the richest silks and satins (which they plundered from the shops and houses of the wealthy), smoke opium, and make a profession of regard for the Christian religion, were now either skulking fugitives, or had atoned with their blood for their crimes.

I was heartily glad when my boat had passed the place into purer air. As my boatmen sculled all night, in the morning we were thirty miles distant from Shanghae and within sight of the walls of Cading, an old city which I passed some years ago, when on my way to Soo-chow-foo. Here I remained for several days, inspecting the natural productions of the country. As this city and the surrounding country is frequently visited by missionaries and other residents in Shanghae, a foreigner is a common sight to the natives, who do not crowd round him as they do in more inland towns. I could, therefore, pursue my investigations in town and country without being molested in any way whatever.

The surrounding country, although a plain, is somewhat higher and more undulating in its general character than that about Shanghae. The land is exceedingly fertile and admirably adapted for Chinese cotton cultivation, and consequently we find that cotton is the staple production of the district. But there are many other articles besides which are worthy of notice. The Shanghae indigo (*Isates indigotica*) is largely cultivated in the Ke-wang-meow district, a few miles to the south. The "Hong-wha," a variety of safflower (*Carthamnus tinctorius*), was found for the first time in fields near Cading. This dye, I was informed, was held in high esteem by the Chinese, and is used in dyeing the red and scarlet silks and crapes which are so common in the country and so much and

justly admired by foreigners of every nation. Although I had not met with the safflower in cultivation in any other part of the country, my servants informed me that large quantities were annually produced in the Chekiang province near Ningpo. At this season (June 10th) the crop of flowers had been gathered, and all the plants removed from the land, except some few here and there on the different farms which had been left for seed. The seed was not yet ripe, so that I could not get a supply, but I determined to return that way and secure a portion to send to the Agricultural and Horticultural Society of India, in order to compare the Chinese with the Indian safflower. I believe they have turned out to be alike, or nearly so. Large quantities of fruit and vegetables are also produced in the vicinity of the city. I observed orchards of apple-trees, which is rather a rare sight in this district. The variety of apple was a small one, about as big as our golden pippin, but excellent in flavour; indeed, the only kind worth eating in this part of China. Melons of several different kinds were also extensively cultivated: when they are ripe the markets are literally crowded to overflowing with them, and they are eaten by the natives much in the same way as apples are with us; in fact they seem to be, so to speak, the apples of the country.

In the canals near the city there were large quantities of bamboos partially covered with mud,

so as to be pressed under water. These, I believe, were intended to be made into paper after they had been soaked for some time. The whole of the process of making paper from the bamboo did not come under my notice while travelling in the country, but I believe it is carried out somewhat in the following manner :—After being soaked for some time in the way I have noticed, the bamboos are split up and saturated with lime and water until they become quite soft. They are then beaten up into a pulp in mortars, or where water-power is at hand, as in the hilly districts, the beating or stamping process is done by means of stampers, which rise and fall as the cogs which are placed on the axis of the water-wheel revolve. When the mass has been reduced to a fine pulpy substance it is then taken to a furnace and well boiled until it has become perfectly fine, and of the proper consistency. It is then formed into sheets of paper.

Bamboo-paper is made of various degrees of fineness according to the purposes for which it is intended. It is not only used for writing upon, and for packing with, but a large quantity of a coarse description is made for the sole purpose of mixing with the mortar used by bricklayers.

In the fields about Cading I found two fine species of carabus, under stones, which were highly prized by entomologists at home. On the first discovery of these insects I showed them to a group of children who were with me, and offered

to buy all they brought me at the rate of thirty cash for each perfect specimen. I dare say they considered me insane or foolish, and I thought I could detect a look of pity on some countenances; but the motley group by which I was surrounded was soon scattered in all directions, engaged in turning over stones, lumps of loose earth and rubbish, and eagerly looking for the insects I wanted. The news was soon communicated to the old women in the villages, who were as anxious as the children, and many were the disputes and tumbles they had when scrambling for these beetles.

By this means I soon procured as many specimens of these insects as I required, and then the difficulty was to induce my crowds of collectors to leave off collecting. I have already stated that the natives always believed I was collecting insects for medicine, and, therefore, had no idea of some forty or fifty of each kind being enough.

Leaving Cading I pursued my journey to the westward in the direction of Tsing-poo. Soon after dark I found myself on the borders of an extensive sheet of water. My boatmen refused to proceed farther that night, telling me they could not find their way in the dark, and that if the wind rose we would be placed in a dangerous position. As this part of the country was unknown to me I considered it best to allow the men to have their own way, and so we brought up for the night.

When I awoke at daybreak on the following morning we were already under way, and sailing with a fair wind across the lake. It was not difficult to perceive the justice of the remarks made by the boatmen the evening before; indeed, it seemed a difficult matter to find our way in broad daylight. This is a most extraordinary part of the country: the lake, or rather lakes, extend in all directions for many miles, sometimes so narrow as to have the appearance of canals, and then again expanding into large sheets of water. Everywhere the shores are low, and have a most irregular outline formed by a succession of reed-covered capes and deep bays.

After sailing for a distance of six or eight miles we came to what appeared at first sight to be a canal leading out of the lake. It proved, however, to be merely a neck of water which led into another lake equal in size to that which we had just crossed. And so we went on during the whole day through this dreary region. The low marshy shores seemed to be thinly inhabited, although in the neighbourhood of the richest and most populous part of the Chinese empire; indeed, almost the only sign of the place being inhabited by human beings was, strange to say, the numerous coffins and graves of the dead, which were continually coming into view as we sailed along. It is not improbable, however, that many of these had been brought from other districts to those *lucky* spots and laid down, or interred

according to circumstances, by the surviving relatives.

The lakes themselves had a much more lively appearance than those dreary shores. The white and brown sails of boats like our own were observed in great numbers making for the mouths of the various canals which form the highways to the large towns and cities in this part of China. Those seen going in a southerly direction were bound for Hang-chow-foo, and the towns in that district; those sailing northwards were on their way to Soo-chow-foo, while those going in the same direction as ourselves were for the silk country and its rich and populous cities.

The water of the lakes was as smooth as glass, and in many places very shallow. Various species of water-plants, such as *Trapa bicornus*, Nympheas, &c., were common, while here and there I came upon the broad prickly leaves of *Euryale ferox* covering the surface of the water.

In the afternoon the scenery began to assume an appearance somewhat different from that of the morning. The country was evidently getting higher in level and more fertile and populous. To the westward I thought I could detect a real boundary to the waters, but I did not feel quite certain of this as I had been deceived several times during the day. About five P.M. we arrived at a place named Ping-wang or Bing-bong, as it is pronounced in the dialect of the district. This proved to be a small bustling town on the edge of

VIEW ON THE GRAND CANAL, WITH MULBERRY-TREES ON ITS BANKS.

the lakes, and rather important from the central position which it occupies. Fine navigable canals lead from it to all the important towns of this large and fertile plain. A very fine one leads on to the city of Hoo-chow to which I was bound. On one side it has a substantial paved pathway, which is a high road to foot-passengers, and is also used by the boat-people in tracking their boats and junks. I was now able to leave my boat to be sculled slowly along, and walk along the banks of the canal.

I had reached the eastern borders of the great silk country of China—a country which in the season of 1853–54 exported upwards of 58,000 bales of raw silk.

The mulberry was now observed on the banks of the canal, and in patches over all this part of the country. The lakes which I had passed through, and which I have endeavoured to describe, were now left behind, and a broad and beautiful canal stretched far away to the westward, and led to the great silk-towns of Nan-tsin and Hoo-chow-foo. Hitherto the country had been completely flat, but now some hills at a great distance on my right-hand came into view. These I afterwards ascertained were the Tung-t'ing-shans, situated on the T'ai-hu Lake—one of the largest lakes in China, which covers a considerable extent of country between the cities of Hang-chow-foo and Soo-chow-foo. As we passed along the country seemed exceedingly rich and fertile; and mulberry-planta-

tions met the eye in every direction. A great quantity of rice was also produced on the lower lands. The natives seemed well to do in the world, having plenty of work without oppression, and enough to procure the necessaries and simple luxuries of life. It was pleasant to hear their joyous and contented songs as they laboured amongst the mulberry-plantations and rice-fields.

In the evening we arrived at Nan-tsin, and as I was anxious to see something of this celebrated silk-town by daylight, I determined on remaining there for a few days. Early next morning I was up and on my way to see the town. Even at this early hour—five A.M.—the roads were full of people; for like other nations the Chinese hold their markets in the morning. The streets in the town were lined with vegetables of all kinds, and the fruits of the season were abundant and cheap, particularly water-melons, peaches, plums, &c. Butchers' stalls groaned under loads of fat pork; there was an abundance of fresh and salt fish; ducks, geese, and fowls, were there in hundreds, and, indeed, everything was there which could tempt the eye of the Chinese epicure, except cats, rats, and young puppies, and these are not appreciated in this part of the country.

Frogs are in great demand in all the Chinese towns, both in the north and south, wherever I have been, and they were very abundant in Nan-tsin. They abound in shallow lakes and rice fields, and many of them are very beautifully

coloured, and look as if they had been painted by the hand of a first-rate artist. The vendors of these animals skin them in the streets in the most unmerciful and apparently cruel way which I have already described.

There are many good streets and valuable shops in Nan-tsin, but they are very much like what I have seen and described in other cities in China. What struck me most was the large quantity of raw silk which was here exposed for sale. Soon after daylight the country people began to arrive with their little packets of silk, which they intended to sell to the merchants. The shops for the purchase of this article appeared to be very numerous in all the principal streets. Behind the counter of each shop stood six, eight, and sometimes more, clean, respectable-looking men, who were silk inspectors, and whose duty was to examine the quality of the silk offered for sale, and to name its value. It was amusing to notice the quietness of these men compared with the clamorous crowds who stood in front of their shops with silk for sale. Each one was expatiating on the superior quality of his goods and the lowness of the offer that had been made to him. Many of the vendors were women, and in all instances they were the most noisy. The shopmen took everything very quietly, and rarely offered a higher price than they had done in the first instance. But notwithstanding all the noise and bustle everything seemed to go on satisfactorily, and

when the money was paid the people went off in high spirits, apparently well satisfied with the sales they had effected.

From the observations which I made at this time on the farms and markets in this the great silk country of China, it appears that, however large in the aggregate the production of silk may be in the country, this quantity is produced not by large farmers or extensive manufactures, but by millions of cottagers, each of whom own and cultivate a few roods or acres of land only. Like bees in a hive each contributes his portion to swell the general store. And so it is with almost every production in the celestial empire. Our favourite beverage, tea, is produced just in the same way. When the silk has thus been bought in small samples from the original producers, it is then the business of the native inspectors and merchants to sort it and arrange it into bales of similar quality for home consumption or for exportation.

Nan-tsin is not a walled city, and politically it is a place of small importance. But it is a place of great wealth and size, extending for miles on each side of the canal, and far back into the country. I believe there is a larger trade in silk done here than even in the city of Hoo-chow-foo itself. The people generally seemed to have plenty of work, and judging from their clean, healthy, and contented appearance, they are well paid for their labour.

During my walk in the town I was surrounded

and followed by hundreds of the natives, all anxious to get a view of the foreigner. But except the inconvenience of the crowd I had nothing to complain of, for all were perfectly civil and in the best humour.

I spent the next few days in the vicinity of Nan-tsin, and as it may be considered the centre of the great silk country of China, I shall endeavour now to give a description of the cultivation and appearance of the mulberry trees.

The soil over all this district is a strong yellow loam, well mixed and enriched by vegetable matter; just such a soil as produces excellent wheat crops in England. The whole of the surface of the country, which at one period has been nearly a dead level, is now cut up, and embankments formed for the cultivation of the mulberry. It appears to grow better upon the surface and sides of these embankments than upon level land. The low lands, which are, owing to the formation of these embankments, considerably lower than the original level of the plain, are used for the production of rice and other grains and vegetables. It is therefore on the banks of canals, rice fields, small lakes and ponds, where the mulberry is generally cultivated, and where it seems most at home. But although large quantities of rice and other crops are grown in the silk districts, yet the country, when viewed from a distance, resembles a vast mulberry garden, and when the trees are in full leaf, it has a very rich appearance.

The variety of mulberry cultivated in this district appears to be quite distinct from that which is grown in the southern parts of China and in the silk districts of India. Its leaves are much larger, more glossy, and have more firmness and substance than any other variety which has come under my notice. It may be that this circumstance has something to do with the superior quality of the silk produced in the Hoo-chow country, and is worthy of the notice of silk growers in other parts of the world.

This peculiar variety is not reproduced by seed, and hence all the plantations are formed of grafted trees. Each plant is grafted from a foot to two feet above the ground, and rarely higher. The trees are planted in rows from five to six feet apart, and are allowed to grow from six to ten feet high only, for the convenience of gathering the leaves. In training them they are kept open in the centre; the general outline is circular, and they are not unlike some of those dwarf apple-trees which are common in European gardens. The accompanying sketch gives a good representation of the habit and form of one of those trees which has attained its full size.

The different methods of gathering the leaves in these districts are curious and instructive, and show clearly that the cultivators well understand the laws of vegetable physiology. Leaves are not taken at all from plants in their young state, as this would be injurious to their future productive-

ness. In other instances a few leaves only are taken from the bushes, while the remainder are

Mulberry Tree.

allowed to remain upon the shoots until the summer growth is completed. In the latter case the leaves are invariably left at the *ends* of the shoots.

When the bushes have attained their full size, the young shoots with the leaves are clipped close off by the stumps, and shoots and leaves carried home together to the farm-yard to be plucked and prepared for the worms. In the case of young trees the leaves are generally gathered by

the hand, while the shoots are left to grow on until the autumn. At this period all the plantations are gone over carefully; the older bushes are pruned close in to the stumps, while the shoots of the younger ones are only shortened back a little to allow them to attain to the desired height. The ground is then manured and well dug over. It remains in this state until the following spring, unless a winter crop of some kind of vegetable is taken off it. This is frequently the case. Even in the spring and summer months it is not unusual to see crops of beans, cabbages, &c., growing under the mulberry trees.

During the winter months the trees are generally bare and leafless. Those persons who are accustomed to live in countries with marked seasons, where the winters are cold, and where the great mass of vegetation is leafless, would not be struck with this circumstance in the silk country of China. But the view one gets in this country in the summer months, after the first clipping of the shoots, is curious and striking. As far as the eye can reach, in all directions, one sees nothing but bare stumps. It looks as if some pestilential vapour had passed over the plain and withered up the whole of these trees. And the view is rendered still more striking by the beautiful patches of lively green which are observed at this time in the rice-fields and on the banks of the canals. This system of clipping close in to the stumps of the old branches gives the trees a curious and

deformed appearance. The ends of the branches swell out into a club-like form, and are much thicker there than they are lower down.

The following sketch explains the state in which those trees are seen after they have been deprived of their stems and leaves.

Mulberry Tree.

After I had completed my inspection of the country near the town of Nan-tsin, I proceeded onwards to the west in the direction of Hoo-chow-foo. A few hours' sail on a wide and beautiful canal brought me within view of the mountain ranges which form the western boundary to the

great plain of the Yang-tse-kiang, through which I had been passing for several days. The most striking hill which came first into view was crowned by a seven-storied pagoda. It had a large tree by its side, equally striking in the distance, and which had probably been planted when the pagoda was built. I afterwards ascertained this to be the "maidenhair-tree" (*Salisburia adiantifolia*), a tree which attains a large size in this part of China, and is extremely ornamental.

As I neared Hoo-chow the general aspect of the country appeared very different from that through which I had been travelling for upwards of one hundred miles. The general level seemed higher, and little well-wooded hills adorned the surface of the country. I visited these hills as I went along for the purpose of examining their vegetation. In most cases I found pretty temples near their summits, surrounded with trees. From these spots the most charming views were obtained of the great mulberry plain, the city of Hoo-chow, and the mountain ranges which form the background towards the west.

In one of the temples which I visited I found a priest who was a native of Ningpo, the town to which my servants belonged. He received us most cordially, and appeared glad to have an opportunity of talking with his townsmen, and getting all the news from his native place, which he had not visited for several years. In one of the cells of this temple we were shown a priest

who had been submitting to voluntary confinement for nearly three years. It is not unusual to find devotees of this kind in many of the Buddhist temples of China. Although they never come out of their cells until the time of their confinement expires, they have no objection to see and converse with strangers at their little windows. The person whom we visited at this time received us with Chinese politeness, asked us to sit down on a chair placed outside his little cell, and gave us tea, on the surface of which various fragrant flowers were swimming.

CHAPTER XVII.

Enter the city of Hoo-chow-foo — Method of managing Chinese crowds — Description of the city — Richness of the shops — Fans and silks — Rich dresses of the people — Raw silk and hongs — Flowered crapes — Chinese play and audience — How I perform my part! — Leave the city — Charming scenes in the country — Thrown silk — Silk villages and their inhabitants — Temple of Wan-shew-si and its priests — Taou-chang-shan pagoda — Glorious views from the pagoda hill.

ON the 17th of June I reached the city of Hoo-chow-foo—the City of the Lakes and the capital of the principal silk-country of China. According to Chinese accounts, this city is about six miles in circumference, and contains about a hundred thousand families. Both of these statements are probably exaggerated, as the walls did not appear to me to be more than three, or at most four, miles round. As I was anxious to see something of the interior of the city, I sent one of my men to procure a sedan-chair, for the day was excessively warm. The chairmen soon made their appearance, but as their demands for hire were so exorbitant, I refused to comply with them and determined to walk—a proceeding which, although not so comfortable, would enable me to see more of the shops and people.

Entering at the south gate, I proceeded in a northerly direction, and examined all the principal

streets on my way. Thousands of people followed me as I went along. They were very uproarious, but good-humoured withal, and appeared delighted with the opportunity of seeing a "Pak Quei-tze," or white devil—a term by which foreigners are designated in this civilized part of the world. Although this term was sometimes used in a tone of contempt or insult, showing that those who used it fully understood its meaning, yet generally it was not so. Upon one occasion some friends of mine remonstrated with some of these polite people, and endeavoured to explain to them that the term was one to which we were not exactly entitled, and that it was not very agreeable. In reply the Chinese expressed surprise and regret for having used the term and thus given offence; but innocently asked if we were not white devils; and if not, what we were, and by what name they should call us!

Alone as I now was, and surrounded by thousands of Chinese in one of their inland cities, it was absolutely necessary to keep my temper under the most complete control. In circumstances of this kind, if one laughs and jokes with the crowd, and takes everything in good part, all will generally go well, for the Chinese are upon the whole good-humoured and polite; but if he by any chance loses his temper, he will most certainly get the worst of it, and most likely will be hooted and pelted with stones. I had had some experience in the management of Chinese crowds, and therefore

continued to be in the sweetest possible frame of mind in the midst of the thousands who followed me through the city as if I had been a wild animal or "white devil" indeed.

As I threaded my way slowly along, in addition to the dense crowds that followed and preceded me, every window and doorway was crowded with curious-looking faces all anxious to get a view of the foreigner. It was curious to mark the varied expression in the different countenances. In some there was a look of contempt, in others wonder was strongly depicted; but in the vast majority there was wonder mingled with fear, as if I was in reality a being from another world. Keeping onward in a northerly direction, and diverging now and then to the right or left, according as an object of interest met my eye, I arrived at last at the north gate of the city. Here I ascended the ramparts in order to get a good view. Outside the walls I observed a large dense suburb, with a pretty pagoda and a canal leading through it in the direction of the T'ai-hu lake. Throwing my eyes over the city, the roofs of the houses seemed nearly all of the same height; indeed this is a striking characteristic of all Chinese towns which I have visited. One rarely sees any difference in the height of the houses except when a temple, a pagoda, or a watch-tower disturbs the monotony of the view. I believe the Chinese have a strong prejudice against one house being raised higher than the others.

I now walked round the ramparts from the north to the east gate, and then crossed the town from east to west in the same leisurely way I had done from south to north. A fine broad stream, or rather canal, crosses the city from south to north, and forms the chief highway for the boat-traffic, for boats are the carriages in this part of China and canals are the highways. This stream was crowded with boats of all sizes; some were discharging goods and passengers at the jetties on its banks, while others were hurrying onward deeply laden with goods and passengers for other parts of the country.

The city near the south gate by which I entered had rather a poor appearance, but the centre, and particularly the northern side, appeared rich and densely populated. Many of the shops were crowded with articles of great beauty and value. The fronts of Chinese shops are not shut up as ours are; the interior is fully exposed to passers-by, so that I got an excellent view of their contents without the inconvenience of going inside. The silk fans struck me as being more gorgeous and handsome than any I had seen in other towns. Manufactured crapes and silks were also plentiful, and judging from the dresses of the people of both sexes, these goods must be in great demand. I have visited many Chinese towns, and I must say I never saw the people as a whole better dressed than those of Hoo-chow. Every person I met above the common working coolie was dressed in

silks or crape, and even the coolies have at least one silk dress for holyday wear.

Although the fans and silks of Hoo-chow struck me particularly when walking through the town, it abounds also in all kinds of articles in common use amongst the people. Embroidered shoes, hats, caps, umbrellas, tobacco-pipes made of bamboo and nicely painted, porcelain of all kinds, and indeed every conceivable article in demand amongst the natives.

But in Hoo-chow, as at Nant-sin, the great trade of the place is in raw silk. Near the north gate many large hongs were pointed out to me where this trade is carried on most extensively. Here the silk is sorted, stowed, and made up into parcels, which are afterwards despatched to Shanghae, and offered for sale to foreign merchants. It is estimated that about four-fifths of the silk produced in this district is exported to Europe and America; but considering the large quantity consumed by the people themselves, I doubt if the proportion exported is so large.

The greater part of the silks and crapes used in this part of China are manufactured in the adjoining towns of Soo-chow and Hang-chow. Flowered crape, however, a very beautiful production, is made in Hoo-chow. The process of manufacture is thus described by the Rev. Mr. Edkins in the 'North China Herald:'—

"Two men were engaged at a loom in a cottage on the side of a stream. One sat at the end of the

loom moving five pedals, and directing the shuttle and all that needed to be done with the threads that lay horizontal on the frame. The other was perched overhead to superintend the pattern. This he did by means of vertical threads tied up in bundles, a large number of which, distributed transversely through the threads of the horizontal frame beneath him, were at his disposal. These he raised according to the requirement of the pattern, and thus caused that elevation in the threads on the frame below that constituted the flowered part of the piece."

Like their countrymen all over China, the Hoochow people are fond of the drama. During my visit to the city a fine play was going on in one of the temples near the north gate. I had many pressing invitations, from individuals in the crowd who were following me, to go and see the play. But having seen many of these exhibitions on former occasions, I had no wish to see this one, more particularly as I knew well that all the rabble in the town are generally collected about such places. My companions, however, rather outwitted me, and gained their point before I was aware of it. Having a kind of mania for collecting ancient works of Chinese art, such as porcelain vases, bronzes, enamels, and such things, I had been making many enquiries regarding them as we went along, and had already made several purchases of considerablē interest. I was now told by a person in the crowd that he would take me to

an old curiosity-shop hard by, where I would see some fine things such as I wanted. Without suspecting anything, I desired him to lead the way, and I followed him. To my surprise, and I must confess to my amusement too, for I was in a capital humour, I found myself in a few minutes ushered into the temple square, where two or three thousand heads were gaping intently up to a platform covered with actors, who were in the midst of what appeared to be a most interesting melodrama, judging from the effect it had upon the audience. I saw at once I had been duped, and, looking for my guide and conductor, found that he had disappeared, no doubt fully satisfied with the part he had played. My part was now to enjoy the joke and take it in good part, which I did not fail to do. I was now pressed on all hands for my opinion of the merit of the performance, which I declared was inimitable. Nor was there any flattery intended in this expression of opinion, for I doubt much if such a performance could have been got up out of the Celestial Empire.

It was some time before a large portion of the crowd found out that a foreigner was amongst them, so intent were they upon the performance, and longer still before the eyes of the actors saw me. By degrees, however, the news spread, and all eyes were turned from the stage to where I was standing. At first the actors seemed surprised at the want of that attention to which they had been accustomed, then they discovered the cause,

and, if possible, were more astonished than their audience. In vain the prompter and leader of the band urged them to go on; their "occupation was gone" until the greater attraction was removed. Prudence now suggested that, having thus come unexpectedly upon the scene and played my part, it would be as well to withdraw while there was time. I now bowed very politely to the most respectable of the people who were standing near me, and expressed my delight and thanks for what I had seen. I then edged quietly out of the crowd, a few of whom followed me, while the greater part remained to enjoy the rest of the performance, which I have no doubt was concluded in a most satisfactory manner.

The day was now far advanced, and as I had been surrounded by noisy, although good-humoured, crowds since the morning, I was excessively tired. I therefore made the best of my way back to the southern suburbs, where I had left my boat in a retired creek surrounded on all sides by mulberry-trees. But even here I could not get the quiet I wished for. Numbers followed me to where my boat was moored, and pestered me with all sorts of questions. It was generally believed by them that I had come from Shanghae for the sole purpose of buying silk, nor could my assurances to the contrary convince them they were mistaken.

In order to get rid of inquisitive crowds I now gave orders to my boatmen to leave our moorings

and go on to the southwards; but did not tell them to what point we were bound. By this means the crowds were quite puzzled, and returned to their homes inside the city. In passing under one of the bridges here, and often both before and after this when in the same position, the head boatman warned us not to speak; for, said he, "if you do so, something evil will happen to us afterwards." There is a superstition amongst them, to the effect that those who speak while passing under a bridge will be punished by being involved in a quarrel.

After passing out of the creek I found myself on a broad and beautiful canal which leads to the southwards in the direction of Hang-chow-foo. As it was my intention to remain for some days in the vicinity of Hoo-chow, we soon found a small creek on the east side of this canal, which led up to the bottom of a richly-wooded hill. Having sculled the boat up there, we made her fast to the grassy bank of the creek, and, while dinner was getting ready, I went on shore.

It was a lovely evening—the 18th of June—the sun was just setting behind the high mountain-ranges to the westward, and although the day had been oppressively warm, the air was now comparatively cool and enjoyable. I was in the midst of most charming scenery, and although only about two miles distant from a crowded and bustling city, everything was perfectly quiet and still. Overhead the rooks were seen returning home for

the day, and here and there on a solitary bush or in a grove of trees the songsters of the woods were singing their last and evening song of praise. Mulberry-trees, with their large rich green leaves, were observed in all directions, and the plantations extended all over the low country and up to the foot of the hills. The hills here were low and isolated, and appeared as if they had been thrown out as guards between the vast plain, which extends eastwards to the sea, and the mountains of the west. For the most part they were covered with natural forests and brushwood, and did not appear to have ever been under cultivation. In some parts their sides were steep—almost perpendicular — while in others the slope was gentle from their base to the summit. Here and there some rugged-looking granite rocks reared their heads above the trees, and were particularly striking.

Looking to the hills, there all was nature pure and unadorned, just as it had come from the hands of the Creator; but when the eye rested on the cultivated plain, on the rich mulberry-plantations, on the clear and beautiful canals studded with white sails, the contrast was equally striking, and told a tale of a teeming population, of wealth and industry.

I remained for three days amongst these hills, and employed myself in examining their natural productions, and in making entomological collections. In some grassy glades in the woods I fre-

quently came upon little bands of natives engaged in making thrown silk. A long, narrow framework of bamboo of considerable length was constructed, and over this the threads were laid in the state in which they came from the reel. At the end of the frame collections of these threads were attached to a number of round brass balls about the size of marbles. A rapid motion was communicated to the balls by a smart stroke between the palms of the hands. The workmen went along the line of balls with the quickness of lightning, striking one after the other and keeping the whole in motion at the same time, until the process of twisting the silk was completed.

The little silk-villages at the base of these hills were all visited by me at this time, and although the natives were much surprised at the presence of a foreigner amongst them, yet generally they were polite and hospitable. The same features of wealth and comfort which I had already remarked in other parts of the silk-country were apparent here. The people were well dressed, had good substantial houses to live in, and, judging from their appearance, they were well fed. Nearly all the respectable farm-houses were surrounded with high walls. In addition to keeping their families as private as possible, the object of having the houses constructed in this way was probably for safety to their property, which is often very valuable during the silk season. I am not aware that these

districts are much infested with thieves, but the respectable Chinese country farmer is generally very timid in his nature, and would much rather incur considerable expense in making his house secure than run any risk of having it plundered, or to be obliged to defend it.

When I had completed my examination of this part of the country, and made some interesting entomological collections, I bade adieu to the hospitable villagers. My object was now the pagoda I had seen in the distance when nearing Hoochow, with the large tree growing by its side, both together forming the most striking landmark in this part of China. It was only two or three miles west from where I had been sojourning for the last few days, and about two miles from the south gate of the city. By means of canals and small creeks I was enabled to get my boat nearly to the foot of the hill on which the pagoda stands. It being late in the evening when we arrived there, I slept near a small village at the head of the creek, and made arrangements to ascend the hill early next morning.

Some time before daybreak my servant Tung-a brought me a cup of tea, which I drank and then made preparations for our journey. It seemed we had anchored at the place to which worshippers come in their boats when they are going to the temple and pagoda. We found an excellent paved road leading up to the monastery of Wan-sheu-si, which is situated in a romantic hollow, a little

below the hill on whose summit the pagoda stands. The soil of these hills is sandy and barren, and contrasts unfavourably with that in the rich plains below. Avenues and clumps of pines (*Pinus sinensis*), many of which had no doubt been planted by the priests, lined the ascent, and gave it a very pretty appearance. As we ascended by the windings of our mountain-road, we often lost sight of the plain which we had left, and were surrounded on all sides by hills.

Half-an-hour's walk brought us near the doors of the monastery of Wan-sheu-si, a large and imposing building, or rather collection of buildings, founded about a thousand years ago by a certain Fuh-hu-shan-si—the "Tamer of the Tiger." His picture is still preserved in the monastery, and represents him seated on a tiger, whose ferocity he had completely tamed, and who now was content to carry him over hill and dale and obey his commands!

The priests here—about thirty in number—received me with great ceremony and kindness, and ordered tea and cakes to be set before me. I was also taken to see two hermits who were undergoing voluntary solitary confinement for a period of three years. One of them had been nearly two years shut up in his cell, and consequently had another year to remain there before he could come out again and mix with the world.

After partaking of the tea which the good priests had kindly set before me — and very re-

freshing it was after my morning walk — I proceeded up the hill towards the pagoda. Here I was received by a solitary priest and a little boy who seemed his servant. The priest took me into a small room in which was a bed, a table, and a few books—all he possessed in the world, so he told me. He informed me, in answer to my questions, that the pagoda was called Taou-chang-shantā. It appeared to be ancient, for the adjoining temple, which had probably been built about the same period, was now in a very ruinous condition. Being curious to know what the tree was which, with the pagoda, formed such a striking sight when seen from a distance, I paid it a visit and found it was the maidenhair-tree (*Salisburia adiantifolia*).

If the pagoda and maidenhair-tree were striking from a distance, the view from the top of the hill where they stood was equally so, and of quite a different character. The bustling city of Hoochow-foo, with its walls, rampart, and broad and beautiful canals lay at my feet. Looking eastward the country was perfectly flat as far as the eye could reach—it is one vast rich and fertile mulberry-garden. On the west the prospect was bounded by a long range of mountains, very irregular in height, form, and general outline, and some of them very high. The T'ai-hu lake with its islands—the Tung-ting-shans—were seen to the north, and far away on the horizon to the south-east the little hills near Chapoo are just visible on a clear day.

I gazed long with rapture upon the wonderful scene which lay beneath and around me. Many views which I have had both before and since that time, when travelling in the Himalayas, have been perhaps more grand and sublime, owing to the stupendous height of these mountains, but as a view of marvellous richness and loveliness that from the top of Taou-chang-shan stands unrivalled.

CHAPTER XVIII.

Ascend the Lun-ke river — A musical Buddhist high priest — Hoo-shan monastery — Its silk-worms — Mode of feeding them — General treatment — Their aversion to noise and bright light — The country embanked in all directions — A farmer's explanation of this — Town of Mei-che — Silk-worms begin to spin — Method of putting them on straw — Artificial heat employed — Reeling process — Machine described — Work-people — Silk scenes in a monastery — Industrious Buddhist priests — Novel mode of catching fish — End of silk season — Price of raw silk where it is produced.

I SPENT a week in the midst of this beautiful scenery, and experienced nothing but kindness and civility from the hundreds of natives with whom I came daily in contact. During this time I gained a good deal of information regarding the hilly districts to the westward, which I intended to penetrate before I left this part of the country. I found that a river of considerable size flowed up to the west gate of the city, and apparently emptied itself into the net-work of canals which cover this extensive plain; and I was informed that it was navigable for upwards of twenty miles to boats much larger than the one I was travelling in. My object now was to get my boat into that river, and as all these rivers and canals are connected this was accomplished without the least difficulty. We returned to the south gate of Hoo-

chow, where we found a wide canal leading round the walls to the west gate. Following this canal we soon skulled round, and found ourselves on a wide and deep river which takes its rise amongst the hills in the far west. It is called Lun-ke by the natives, and probably one of its most distant sources is near the celebrated Tein-muh-shan—a mountain said to be the highest in this part of China.

In sailing up this river I observed that the plantations of mulberry still formed the staple crop of the country on all the flat lands which were raised above the surface of the rice-fields. About sixty le west of Hoo-chow-foo I observed a large monastery not very far from the banks of the river, and as it seemed situated in the midst of rich and luxuriant vegetation, I determined to moor my boat to the banks of the river, and remain in the neighbourhood for a few days. As I was going up the road in the direction of the temple I met an old respectable-looking priest carrying a kind of flute or flageolet in his hand, which he induced now and then to give out not unmusical sounds. His head was shaven after the manner of the priests of Buddha; but the three nails on his left hand were each about two inches in length, denoting that he did not earn his bread by the sweat of his brow, and that in fact he was one of the superiors in the order to which he belonged. This old gentleman met me in the most dignified manner, and did not express

the least surprise at seeing a foreigner so far from home. He asked me to accompany him home to his temple, and when we arrived there he introduced me to his own quarters and desired his servants to set tea and cakes before me. He then led me over all the halls and temples of the monastery, which, although very extensive, were in a most dilapidated condition. They were too much like buildings of this kind in other parts of the country to require any further notice.

If there was little to notice in these temples with reference to Buddhism and its rites, there were objects of another kind which soon attracted my attention. The halls and outhouses of the monastery seemed to be converted for the time into a place for feeding silk-worms. Millions of these little animals were feeding in round sieves, placed one above another in open framework made for this purpose. So great was the number of the worms that every sieve—and there must have been many hundreds of them—was crammed quite full. In one large hall I observed the floor completely covered with worms. I shall never forget the peculiar sound which fell upon my ear as I opened the door of this hall. It was early in the morning, the worms had been just fed, and were at the time eagerly devouring the fresh leaves of the mulberry. Hundreds of thousands of little mouths were munching the leaves, and in the stillness around this sound was very striking and peculiar. The place too seemed so strange—

a temple—a place of worship with many huge idols, some from twenty to thirty feet in height, looking down upon the scene on the floor. But to a Chinese there is nothing improper in converting a temple into a granary or a silk-worm establishment for a short time if it is required, and I suppose the gods of the place are supposed to look down with approbation on such scenes of peaceful industry.

When from the large number of worms it is necessary to feed them on floors of rooms and halls, there is always a layer of dry straw laid down to keep them off the damp ground. This mode of treatment is resorted to from necessity, and not from choice. The sieves of the establishment, used in the framework I have already noticed, are greatly preferred.

Whether the worms are fed on sieves or on the floor they are invariably cleaned every morning. All the remains of the leafstalks of the mulberry, the excrement of the animals, and other impurities, are removed before the fresh leaves are given. Much importance is attached to this matter, as it has a tendency to keep the worms in a clean and healthy condition. The Chinese are also very particular as regards the amount of light which they admit during the period the animals are feeding. I always observed the rooms were kept partially darkened, no bright light was allowed to penetrate. In many instances the owners were most unwilling to open the doors, for fear, as they

said, of disturbing them; and they invariably cautioned me against making any unnecessary noise while I was examining them.

At this time nearly all the labour in this part of the country was expended on the production of the silk-worm. In the fields the natives were seen in great numbers busily engaged in gathering the leaves; boats on the rivers were fraught with them; in the country market-towns they were exposed for sale in great quantities, and everything told that they were the staple article of production. On the other hand, every cottage, farm-house, barn and temple, was filled with its thousands of worms which were fed and tended with the greatest care.

This part of the country is very populous, villages and small towns are scattered over it in every direction, and the people have the same clean and respectable appearance which I had already remarked in other parts of the silk districts. In making my observations on the rearing of the silk-worm I visited many hundreds of these towns and villages, and never in one instance had any complaint to make of incivility on the part of any one.

After staying a few days in the vicinity of the temple of Hoo-shan—for such was its name—I gave my boatmen directions to move onwards further up the river. We passed a number of pretty towns and villages on its banks, and arrived at last at a place called Kin-hwa, where I remained

for two days, and employed myself in making entomological collections and examining the productions of the district. We then went onwards to a small town called Mei-che, which was as far as the river was navigable for boats, and from thirty to forty miles west from Hoo-chow-foo.

Here I moored my boat at a little distance from the town, and determined to remain in the neighbourhood long enough to examine everything of interest which might present itself. Although the country was comparatively level near the banks of the stream, yet I was now surrounded on all sides by hills, and the flat alluvial plain of the Yang-tse-Kiang was quite shut out from my view. In its general features it was rather curious and striking. Everywhere it was cut up into ponds and small lakes, and wide embankments of earth seemed to cross it in all directions. At the first view it was difficult to account for this state of things, and I could not get any satisfactory reason for it, either from my servants or boatmen. I knew well, however, that the Chinese have a good and substantial reason for everything they do, and determined to apply to some farmer as the most likely person to enlighten me. One day when out on an excursion in the country I met an intelligent-looking man, and to him I applied to solve the difficulty.

"These embankments," said he, "which you now see cutting up the country in all directions, were formed many hundred years ago by our

forefathers in order to protect themselves and their crops from being washed away by the floods. The vast plain, through which you have come from Shanghae, is scarcely any higher in level than where we now stand, for you will observe the tide ebbs and flows quite up to Mei-che. With this slow drainage for our mountain streams to the eastward we have frequently a large body of water pouring down upon us from the west, which overflows the river's banks and carries everything away before it. The embankments which you observe running in all directions are intended to check these floods, and prevent them from extending over the country."

Upon giving the matter a little consideration I had no doubt that the explanation given by the Chinese farmer was the correct one, and that however strange these embankments might appear they were necessary for the safety of this part of the country.

Mei-che is a long town on the banks of the stream, and as the river is no longer navigable for the low-country boats a considerable business is done here in hill productions, which are brought down for sale. They are put on board of boats here, and conveyed in them to the towns in the plains.

This town appears to be almost the western boundary of the great silk country. Here the mulberry plantations, although pretty numerous, do not form the staple crop of the district, nor do

they seem to grow with such luxuriance as they do further to the east about Hoo-chow and Nan-tsin. Large quantities of rice and other grains now take the place of the mulberry. In the mountains to the west considerable quantities of tea are produced, and fine bamboos which are sent down to the low country are made into paper. A mountain called Tein-muh-shan, celebrated amongst the Chinese for its height and for its temples, lies to the west of this, and further west still is the great green-tea country of Hwuy-chow, which I examined during my former visit to China.

On my way up from Hoo-chow-foo to Mei-che, and about the 23rd of June, I observed that many of the worms had ceased to feed and were commencing to spin. The first indication of this change is made apparent to the natives by the bodies of the little animals becoming more clear and almost transparent. When this change takes place, they are picked, one by one, out of the sieves, and placed upon bundles of straw to form their cocoons. These bundles of straw, which are each about two feet in length, are bound firmly in the middle; the two ends are cut straight and then spread out like a broom, and into these ends the worms are laid, when they immediately fix themselves and begin to spin. During this process I observed the under side of the framework on which the bundles of straw were placed surrounded with cotton cloth to prevent the cold draught from getting to the worms. In some

instances small charcoal fires were lighted and placed under the frame inside the cloth, in order to afford further warmth. In some of the cottages the straw covered with spinning worms was laid in the sun under the verandahs in front of the doors.

In a few days after the worms are put upon the straw they have disappeared in the cocoons and have ceased to spin. The reeling process now commences, and machines for this purpose were seen in almost every cottage. This apparatus may be said to consist of four distinct parts, or rather, I may divide it into these for the purpose of describing it. There is, first, the pan of hot water into which the cocoons are thrown; second, the little loops or eyes through which the threads pass; third, a lateral or horizontal movement, in order to throw the silk in a zigzag manner over the wheel; and lastly the wheel itself, which is square. Two men, or a man and woman, are generally employed at each wheel. The business of one is to attend to the fire and to add fresh cocoons as the others are wound off. The most expert workman drives the machine with his foot and attends to the threads as they pass through the loops over on to the wheel. Eight, ten, and sometimes twelve cocoons are taken up to form one thread, and as one becomes exhausted, another is taken up to supply its place. Three, and sometimes four, of such threads are passing over on to the wheel at the same time. The lateral or zig-

zag movement of the machine throws the threads in that way on the wheel, and I believe this is considered a great improvement upon the Canton method, in which the threads are thrown on in a parallel manner.

The water in the pan into which the cocoons are first thrown is never allowed to boil, but it is generally very near the boiling point. I frequently tried it and found it much too hot for my fingers to remain in it. A slow fire of charcoal is also placed under the wheel. As the silk is winding, this fire is intended to dry off the superfluous moisture which the cocoons have imbibed in the water in which they were immersed.

During the time I was in the silk country at this time I was continually visiting the farmhouses and cottages in which the reeling of silk was going on. As silk is a very valuable production, it is reeled with more than ordinary care, and I observed that in almost all instances a clean, active, and apparently clever workman was entrusted with the care of the reeling process.

The old temple at Hoo-shan, which I visited again on my way down, was in a state of great excitement and bustle. The quantity of silk produced here was very large, and all hands were employed in reeling and sorting it. The priests themselves, who generally are rather averse to work of any kind, were obliged to take their places at the wheel or the fire. But as the silk was their own they seemed, notwithstanding their

CURIOUS METHOD OF FISHING.

habitual indolence, to work with hearty goodwill. My old friend the Superior, however, was exempt from labour. When I called, and found all the verandahs and courts in a bustle, he was quietly smoking his pipe and sipping his tea with his favourite flageolet by his side. I remained with him during the heat of the day, and in the evening he walked down with me to the river side where my boat was moored. He readily accepted an invitation to come on board, and while there took a great fancy to a copy of 'Punch' and the 'Illustrated London News.' I need not say I made him a present of both papers, and sent him away highly delighted. My boat now shot out into the stream, and as we sailed slowly down I could hear the wild and not unpleasing strains of my friend's flageolet as he wended his way homewards through the woods.

On our way down the river that night we came upon some people fishing in a manner so curious that I must endeavour to describe it. The boats used for this purpose were long and narrow. Each had a broad strip of white canvas stretched along the right side, and dipping towards the water at an angle of from thirty to forty degrees. On the other side of the boat a net, corresponding in size with the white cloth, was stretched along above the bulwarks. A man sat in the stern of each boat and brought his weight to bear on the starboard side, which had the effect of pressing the white canvas into the water and raising the

net on the opposite side. A small paddle was used for propelling the boat through the water. This will be well understood by a glance at the accompanying sketch.

As we approached these strange fishermen, I desired my boatmen to take in our sail, and as my boat lay still on the smooth surface of the water, I watched their proceedings with much interest. It was a fine, clear night, and I could see distinctly the white canvas shining through the water, although several inches beneath its surface. The fishermen sat motionless and silent, and scarcely noticed us when we joined them, so intent were they upon their work. We had not remained above a minute in the position we had taken up, when I heard a splash in the water, and distinctly saw a fish jump over the boat and get caught by the net on its opposite side. The object in constructing the boats in the manner I have described was now apparent. It seemed that the white canvas, which dipped like a painted board into the water, had the effect of attracting and decoying the fish in some peculiar manner, and caused them to leap over it. But as the boats were low and narrow, it was necessary to have a net stretched on the opposite side to prevent the fish from leaping over them altogether and escaping again into the stream. Each fish, as it took the fatal leap, generally struck against the net and fell backward into the boat.

My boatmen and servants looked on this curious

method of catching fish with as much interest as I did myself, and could not refrain from expressing their delight rather noisily when a poor fish got caught. The fishermen themselves remained motionless as statues, and scarcely noticed us, except to beg we would not make any noise, as it prevented them from catching fish.

We watched these fishermen for upwards of an hour, and then asked them to sell us some fish for supper. Their little boats were soon alongside of ours, and we purchased some of the fish which we had seen caught in this extraordinary and novel manner.

On the following morning, when I awoke, I found myself quietly at anchor close by the west gate of Hoo-chow-foo, my boatmen having worked all night. I spent the next few days in the country to the northward bordering on the T'ai-hoo lake, and partly near the town of Nan-tsin, being anxious to see the end of the silk season. About the eighth, or from that to the tenth of July, the winding of the cocoons had ceased almost everywhere, and a few days after this there was scarcely a sign of all that life and bustle which is visible everywhere during the time that the silk is in hand. The clash of the winding-machines, which used to be heard in every cottage, farmhouse, and temple, had now ceased; the furnaces, pans, and wheels, with all the other parts of the apparatus in common use during the winding season, had been cleared away, and a stranger

visiting that country now could scarcely have believed that such a busy bustling scene had been acting only a few days before.

During my perigrinations in the silk country I made many inquiries amongst the natives as to the price of raw silk in the districts where it is produced. An inquiry of this kind is always rather difficult in a country like China, where the natives are too practical to believe one is making such an inquiry merely for the purpose of gaining information. On several occasions the reply to my question was another, wishing to know whether I wanted to buy. Most of the natives with whom I came in contact firmly believed my object in coming to the silk-country was to purchase silks; and neither my assurances to the contrary nor those of my servants, who were generally appealed to on the subject, were sufficient to make them change their opinion. I believe, however, the information I gleaned from various quarters at different times will be found to be tolerably correct. At Mei-che the price was said to range from twelve to eighteen dollars for 100 taels of silk. At Hoo-chow and Nan-tsin, where the silk is of a superior quality, the prices in 1855 were from eighteen to twenty-two dollars for 100 taels. The price of raw silk, like that of everything else, no doubt depends in a great measure upon the supply and demand, and varies accordingly.

CHAPTER XIX.

Leave the silk country — Adventure at Nanziang — A visit from thieves — I am robbed of everything — Unsuccessful efforts to trace the robbers — Astonished by another visit from them — Its objects — My clothes and papers returned — Their motives for this — A visit to the Nanziang mandarin — Means taken to catch the robbers — Two are caught and bambooed — My visit to the mandarin returned — Arrive at Shanghae — Report the robbery to her Majesty's Consul — A portion of the money recovered — The remainder supposed to be kept by the mandarins.

HAVING now finished my inspection of the silk-districts I commenced my journey eastwards, in the direction of Shanghae, where I had some important work awaiting me. I have already stated in a former chapter that it was my intention to call again at Cading on my way in order to procure some seeds which were not ripe when I passed through that place *en route* to the silk-country. On the evening of the third day I arrived at a small town named Nanziang, a few miles to the west of Shanghae, and not very far from Cading, without having any adventures worth recording in these pages. I could not help thinking over the journey I had undertaken, and the quiet and successful manner in which it had been accomplished. Everywhere I had been treated with civility and kindness by the natives;

I had had no trouble whatever with the authorities; and no complaints had been made by them on account of my transgressing the boundary-line drawn out for the restriction of barbarians, or "white devils," as they so politely term us. While congratulating myself upon these results my boat grounded in the midst of the Nanziang canal, and as at least a hundred were in the same predicament ahead of us it was impossible for us to proceed on our journey. My boatmen informed me that it would be necessary to remain where we were until the flood-tide came in, which would be about two or three o'clock in the morning. I was obliged to be contented with this arrangement, and went on shore for a walk while my servants were engaged in preparing dinner.

Between nine and ten o'clock in the evening we retired to rest. As the night was excessively close and warm I allowed the little glass windows in the sides of my boat to remain open in order to admit a little fresh air. These windows were so small that no one could enter the boat by them or take out any of the boxes which lay upon my floor or table. I had, therefore, no suspicion of there being any danger from the arrangement, which added considerably to my comfort. As all the people in the boat, as well as myself, were early risers, and had plenty to do during the day, we were soon fast asleep.

About two in the morning I was awakened by a loud yell from one of my servants, and I sus-

pected at once that we had had a visit from thieves, for I had frequently heard the same sound before. Like the cry one hears at sea when a man has fallen overboard this alarm can never be mistaken when once it has been heard. When it had saluted my ear on former occasions it had proceeded from other boats or places in which I did not feel so great an interest as I perhaps ought to have done. I do not know how to describe it; it sounds like something between fear and defiance, and indicates that were the thieves bold enough to fight the defenders of property would probably run, or if the thieves are inclined to run the others might possibly follow them. In the present instance, and before I had time to inquire what was wrong, one of my servants and two of the boatmen plunged into the canal and pursued the thieves. Thinking that we had only lost some cooking utensils, or things of little value that might have been lying outside the boat, I gave myself no uneasiness about the matter, and felt much inclined to go to sleep again. But my servant, who returned almost immediately, awoke me most effectually. "I fear," said he, opening my door, "the thieves have been inside the boat, and have taken away some of your property." "Impossible," said I, "they cannot have been here." "But look," he replied, "a portion of the side of your boat under the window has been lifted out; I shall light a candle and have it examined."

Turning to the place indicated by my servant I could see, although it was quite dark, that there was a large hole in the side of the boat not more than three feet from where my head had been lying. At my right hand, and just under the window, the trunk used to stand in which I was in the habit of keeping my papers, money, and other valuables. On the first suspicion that I was the victim I stretched out my hand in the dark to feel if this was safe. Instead of my hand resting on the top of the trunk, as it had been accustomed to do, it went down to the floor of the boat, and I then knew for the first time that the trunk was gone. At the same moment my servant Tung-a came in with a candle and confirmed what I had just made out in the dark. The thieves had done their work well—the boat was empty. My money, amounting to more than one hundred Shanghae dollars, my accounts and other papers, including, gentle reader, this journal which has been amusing and instructing you — all, all, were gone. The rascals had not left me even the clothes I had thrown off when I went to bed.

But there was no time to lose; and in order to make every effort to catch the thieves, or at least get back a portion of my property, I jumped into the canal, and made for the banks. The tide had now risen, and instead of finding only about two feet of water—the depth when we went to bed—I now sank up to the neck, and found the stream very rapid. A few strokes with my arms soon

brought me into shallow water, and to the shore. Here I found the boatmen rushing about in a frantic manner, examining with a lantern the bushes and indigo vats on the banks of the canal, but all they had found was a few Manilla cheroots which the thieves had dropped apparently in their hurry. After looking carefully in all directions nothing more could be found. A watchman with his lantern, and two or three stragglers, hearing the noise we made, came up and enquired what was wrong, but when asked whether they had seen anything of the thieves shook their heads and professed the most profound ignorance.

The night was pitch dark, everything was perfectly still, and with the exception of the few stragglers already mentioned, the whole town seemed sunk in a deep sleep. We were, therefore, perfectly helpless, and could do nothing further. Calling my people together I desired them to put out the light and to lie down amongst the long grass which grew on the banks of the canal. In this position they were desired to remain perfectly quiet, and should any person come prowling about he was to be seized without question or warrant. I thought it just possible the thieves might have left some of their plunder in the hurry, and that, when all was quiet, they might return in order to secure it. Having thus formed my plans and set the watch I returned, in no comfortable frame of mind, to my boat, leaving orders to be called should anything of importance take place.

Dripping with wet, and rather low-spirited on account of the misfortune which had befallen me, I lay down on my couch without any inclination to sleep, as may easily be imagined. It was a serious business for me to lose so much money, but that part of the matter gave me the least uneasiness. The loss of my accounts, journals, drawings and numerous memoranda I had been making during three years of travel, which it was impossible for anyone to replace, was of far greater importance. I tried to reason philosophically upon the matter; to persuade myself that as the thing could not be helped now it was no use being vexed with it; that in a few years it would not signify much either to myself or anyone else whether I had been robbed or not; but all this fine reasoning would not do.

I may have lain about an hour in this pleasing frame of mind, brooding over my ill luck, my people were still on shore, the night was very dark, and everything was perfectly quiet and still. Footsteps were now heard coming down the pathway on the opposite side of the canal from that on which my men were posted. Although we did not expect anything to turn up from that quarter we were all attention, and when we could see two figures halt abreast of our boat our excitement was at a very high pitch. "Louda, louda,"* cried one of them, addressing the head boatman. My men immediately started up from their concealment on

* A term always applied to the captain or head man of the boat.

the opposite side and demanded what our visitors wanted. "Louda," said the same voice, with the greatest coolness, and as if he was transacting a very ordinary piece of business, "come over here and receive the 'white devil's' trunks and clothes."

My first impulse on hearing this conversation was to rush out of the boat and endeavour to seize these men, who I had no doubt were the thieves. But common-sense told me that any endeavour to do this in the darkness would surely fail, and might endanger the safety of the things they had brought back. It also struck me that, as the most valuable part of my property was of no use to them, I might possibly recover my books and papers. These considerations induced me to remain quiet in the boat and allow the Chinese to manage matters in their own way.

When my men reached the opposite side of the canal the thieves had disappeared, but had left on the banks my boxes and clothes. On these being brought into my cabin the first thing I examined was the box in which I kept my money and papers. I saw at the first glance that the padlock had been wrenched off, but the lid was now fastened carefully down with a piece of twine. On cutting this I observed that a small box inside in which I had kept my money had also been cut open, and the dollars were all gone. But everything else in the trunk, although bearing evident marks of having been under the examination of the thieves, had been carefully put back. My

accounts, books, journals, and all that I valued most, had been returned to me. Many things, such as knives, pencils, &c., which are highly valued by the Chinese, were left untouched; and even the very padlock of the trunk had been put carefully inside. It was the same with my clothes. Coats, waistcoats, trousers, and even the necktie which I had thrown on the table when I went to bed—everything was returned except the dollars.

This proceeding on the part of the robbers surprised me greatly, and although I regretted the loss of the money I was truly thankful that I had come off so well. What an extraordinary people the Chinese are, and how difficult to understand! The thieves of any other nation would never have thought of bringing back what they did not want; if they do not appropriate the whole of their booty they either destroy it or throw it away. Chinese thieves are much more considerate and civilized; they return what does not suit their purpose to keep!

It is not difficult for a person acquainted with the manners and government of the Chinese to see the propriety and convenience of such a proceeding. In China almost every man is responsible in some way or another for the acts of his neighbour. If a disturbance takes place in a shop or private dwelling the owner of the place is liable to be called upon for an account of it by the authorities; if a fight occurs in the public street the people in the neighbourhood are held responsible; and in

this manner every man is made responsible, to a certain extent, for what goes on around him. In this state of things it will easily be perceived that the gentry who robbed me acted wisely in bringing back all articles which, while they were of no use to them, might have led in some way to their detection. And, no doubt, this was the motive by which they were actuated, and not any regard for my convenience. But I felt truly grateful to them nevertheless, and in this frame of mind I retired again to rest after having secured the windows of the boat and set one of the men to watch.

As soon as daylight appeared I dressed myself and took my servant and one of the boatmen to the house of the highest mandarin in the town, in order to inform him what had happened to us during the night, and to ask him to take steps for the detection of the thieves and the recovery of the money. When we reached his Ya-mun, we were told by his servants that he was not yet awake. On explaining to them that my business was urgent, they promised to carry my message to their master, and politely showed me into the audience hall.

I had not been here for more than five minutes, when the mandarin himself appeared, dressed in his official robes, which he had apparently thrown very hurriedly on. As he entered the hall he made me several most polite bows, which, as in duty bound, I did not fail to return. As is usual

in such cases, we had a long discussion as to who should occupy the seat of honour on the left side of a raised table at the end of the hall. He succeeded at last in getting me into it, and then ordered tea and pipes to be brought and set before us.

We now entered upon the business which had brought me to pay this visit. I told him that I had been travelling for some time in the interior of the country, and that I had never been plundered or molested in any way until I had come to Nanziang, which was under his jurisdiction. He expressed his great regret and indignation, and told me he was sorry to say that there were more thieves and bad characters about his district than that of any other magistrate in this part of China. I then hinted that no time ought to be lost in endeavouring to trace the thieves, and called my servants, who were outside, to explain particularly how and where the robbery had taken place.

An inferior officer was now sent for, and directed to send off runners in every direction to obtain information, and if possible to capture the thieves. Another was sent to accompany me down to where my boat was lying, to examine the manner in which the thieves had entered it, and to make inquiries amongst the people in the neighbourhood. Having thus put things in train, I bade good-by to the mandarin, and took my leave with an invitation to call upon him again in the evening, or on the following morning, when he might

be able to give me some information regarding the recovery of my property.

When we reached my boat, the officer who accompanied me made a minute examination of the mode in which the thieves had effected an entrance. I now observed what I was not aware of before, that a portion of the boat under the window was made to lift out; the thieves, no doubt well aware of this, had only to lift out the window, undo the fastenings inside, and take out a board larger than the window itself, and quite large enough to admit a man or to remove any of my boxes. After examining these matters, and taking down on paper a list of all the articles taken away, those returned to me, and the missing dollars, the officer took his leave in order to prosecute his inquiries.

The news of the robbery by this time had spread over all the town. Hundreds of people came to look at the boat, and to make inquiries as to the truth of what they had heard.

In the afternoon the mandarin whom I had visited in the morning came to return my visit, and to inform me the police had caught one of the thieves. On inquiring if they had recovered the money an evasive answer was given, which I did not much like; so I repeated the question. He then told me that the money would be forthcoming in due time, but that it would be necessary to beat the man with the bamboo that night, and that I should be informed in the morning what success

had attended this operation. Before taking his leave he expressed a wish that I would not leave Nanziang until the next afternoon, when he trusted all would be arranged to my satisfaction. He was very averse to my making any complaint to the English authorities in Shanghae about what had happened.

Early next morning, one of my boatmen who had been in the town informed me, apparently with great satisfaction, that two of the thieves had been caught and bambooed, and that it was reported the money had been recovered. As I did not intend troubling the authorities until the evening, I walked across the country to Cading, in order to procure samples of some seeds which I had marked when there some weeks before.

On returning to my boat in the evening, I despatched my servant to the office of the authorities, with a message stating that I had remained for two days with the prospect of having my property recovered, but that it was my intention now to proceed to Shanghae, and report the matter to the English consul. A very polite message came back stating that the thieves were to be treated with another bambooing that night, and asking me to wait the results. Thinking that the mandarins were trifling with me, and that more would be gained by my absence than presence, I returned my compliments, stating I could wait no longer, and that as soon as the money was recovered I would feel obliged if it was sent to the care of Her

Majesty's consul in Shanghae. My servants and boatmen assured me it had been recovered, and that the mandarins could pay it if they liked.

As Nanziang was within the boundary line within which foreigners are supposed to range, I reported the circumstance to Mr. Robertson, Her Majesty's consul, and requested he would be good enough to assist me in getting back the money. Had the thieves not been found this perhaps would have been scarcely attended with any success; but as I felt certain the Nanziang mandarins had my property in their own hands, I was rather loth to let it remain there.

A few weeks after this I received from the vice-consul, Mr. Harvey, a handkerchief containing thirty-five dollars, a number of small new three-penny pieces, which I used to carry for giving away amongst the children, a brass ring and seal, and various other little things which I had not missed until they were restored to me. The remainder of the money was no doubt retained by the worthy mandarins to pay for their civility and entertainment. The labourer is worthy of his hire!

CHAPTER XX.

Tea-makers from Fokien and Kiangse engaged for India — Ning-chow tea country — Formerly produced green teas — Now produces black — How this change took place — Difficulty in getting the men off — One of them arrested for debt — All on board at last and sent on to Calcutta — Coast infested with pirates — Ningpo missionaries robbed — Politeness of the pirates — Their rendezvous discovered — Attacked and destroyed by the 'Bittern' — A mandarin in difficulty — The English "don't fight fair" — Liberality of the Chinese and English merchants — Captain Vansittart's reward.

ON my arrival at Shanghae I found that the efforts I had been making in order to secure the services of some firstrate black-tea manufacturers for the Government Plantations in the Himalayas had been successful. Eight men, natives of Fo-kien, and well acquainted with the method of making the finest teas of Tsin-tsun and Tsong-gan —districts situated on the south side of the great Bohea mountains, famous for the superior quality of their black teas—had been engaged by Mr. Clark at Foo-chow-foo, and were now on their way to Hongkong and India. They had taken with them an ample supply of the implements in use in those districts for the purpose of manufacturing the leaves, and thus one of the chief objects I had in view in coming to China, after many delays and difficulties, had been successfully accomplished.

Mr. Brooke Robertson, Her Majesty's Consul at Shanghae, had also been unceasing in his efforts to assist me in procuring manufacturers for the Indian plantations. Through his influence nine men, natives of the province of Kiangse, were now induced to engage themselves to go to India. The tea districts in this province, which border the Poyang lake, have risen into great importance within the last fifty years. Moning and Ning-chow * teas are all produced in this part of the country, and are largely exported to Europe and America.

During the days of the East India Company's Charter all the best black teas were produced in the province of Fokien. The towns of Tsin-tsun and Tsong-gan in the vicinity of the far-famed Woo-e hills were then the chief marts for the best black teas exported by the Company. At that period the districts about Ning-chow, in the Kiangse province, were known only for their green teas. Now, however, and for many years past, although the Fokien black teas are, and have been, largely exported, those produced in the Ning-chow districts have risen in public estimation, and, I believe, generally fetch very high prices in the English market.

If there is any one now who still clings to the old idea that green teas can be made *only* from the plant called *Thea virides*, and black ones *only*

* Names of districts well known to merchants engaged in the tea trade with China.

from *Thea bohea*, he will find a difficulty in giving credit to the account I have to give of the manner in which the Ning-chow districts have changed their green teas into black. But, however difficult it may be to get rid of early prejudices, "facts are stubborn things," and the truth of what I have to state may be fully relied upon.

Many years ago a spirited Chinese merchant who, no doubt, saw well enough that black and green teas could be made easily enough from the same plant, had a crop of *black* teas made in the Ning-chow district and brought to Canton for sale. This tea was highly approved of by the foreign merchants at that port, and was bought, I believe, by the great house of Messrs. Dent and Company, and sent to England. When it got home it found a ready sale in the market, and at once established itself as a black tea of the first class. Year by year after this the demand for this tea steadily increased and was as regularly supplied by the Chinese. At the present time the Ning-chow districts produce black teas only, while in former days they produced only green. If proof were wanting, this would appear sufficient to show that black or green teas can be made from any variety of the tea plant, and that the change of colour in the manufactured article depends entirely upon the mode of manipulation.*

From the high character these Ning-chow teas

* A full description of this will be found in my 'Journey to the Tea Countries,' to which I beg to refer those interested in the matter.

had acquired in foreign markets I was well-pleased in being able to engage the services of manufacturers from that district. An engagement was drawn up in English and Chinese by Mr. Sinclair, interpreter to the Consulate, which was signed by the men and by myself; an advance of one hundred dollars was given to each man for the support of their families during their absence, and they were desired to hold themselves in readiness to sail by the first steamer. An old mandarin with a white button, a native of Kiangse, and head of the Kiangse hong in Shanghae, attended with the men at the Consulate, and became security for them at the time that each man received his advance of wages.

The steamer destined to convey these inland Chinamen from the shores of their native land was advertised to sail on the 10th of August 1855. I had given them timely notice of this, and desired them to meet me in front of Mr. Beale's house, at least two hours before the hour appointed for sailing, for I knew well how Chinese procrastinate, and anticipated some difficulty in getting them all on board in time. It was some time after the appointed hour before any of them made their appearance, and I began to fear they would draw back and object to embark at the last moment, even after they had had a liberal advance of wages and after their passage-money to Hongkong had been paid. At last, however, all except one made their appearance with their beds, trunks,

and many other necessaries which they supposed would be required on the voyage. The old white-buttoned mandarin who had become security for them, accompanied them to see them safely away, and very anxious he seemed to be to get them off, and thus get rid of the responsibility which he had taken upon his shoulders, and for which he, no doubt, took care to be well paid.

But now another difficulty presented itself in the shape of a creditor who came down and seized one of the men for debt. In the noise which accompanied and succeeded this seizure it was quite impossible to understand the nature of the case, and to interfere in the matter would only have made things worse. There was nothing to be done except to wait as patiently as possible and allow the contending parties to settle the matter themselves. The business was arranged in some way at last, and as a boat was alongside the jetty, we got them into it and sculled off to the steamer, which was lying in the middle of the river with her steam up and ready for sea.

As the ninth man did not make his appearance, I told the old mandarin with the white button that he would have to return me the hundred dollars I had advanced and the amount of the man's passage-money, should it not be refunded by the agents of the Peninsular and Oriental Company. This he acknowledged was perfectly just, but at this moment another man came on board and offered to go as a substitute for the

runaway. On inquiry I ascertained this man was also a black-tea maker from Kiangse, and as all the others affirmed him to be a first-rate workman, I consented to accept him in lieu of the other. By the time we had concluded this arrangement the vessel's anchor was at the bows, and we steamed away rapidly down the river and out to sea.

My difficulties, in so far as these men were concerned, were now over, and I was heartily glad that my efforts had thus been crowned with complete success. As all these men were from a district several hundred miles inland, and had never been to sea in their lives, I was most anxious that nothing should happen to make them disgusted with the voyage, and took measures to have them kindly treated while at sea. When we reached Hongkong, Mr. Pereira, of Messrs. Dent and Company, was good enough to get his compradore to give them quarters and feed them until an opportunity arrived of sending them on to India.

In a few days the two sets of men—those from Fokien as well as those from Kiangse — were shipped in the steamer "Chusan" for Calcutta, and, after having numerous adventures, which they related to me afterwards with great glee, they all arrived in safety and good health at their destination in the Himalayas.

It was now necessary for me to return once more to the north, in order to settle my accounts

with the Chinese in various parts of the tea districts, and to inform them that I would not require their assistance any longer in making collections of seeds and plants. On our way up the coast, when a few miles south of the Chusan islands, we fell in with Her Majesty's brig "Bittern," Captain Vansittart, at this time busily employed in putting down the hordes of pirates that infested the whole line of coast from Hongkong to the Gulf of Pee-che-lee. A stoppage had almost been put to the native coasting trade by these marauders, and foreign vessels had also been attacked on various occasions. A few weeks before the Rev. Mr. Russell, of the Church Missionary Society at Ningpo, and some other friends, were plundered on their way from that place to the island of Poo-to. While at anchor at a place called Sing-kei-mun, on the south-east end of Chusan, waiting for the tide, their boat was attacked by a number of armed men, and stripped of everything of the slightest value; some of their clothes even were taken away from them. It was useless to resist a force of this kind, and no resistance was offered.

These Chinese pirates when unresisted are not generally cruel or bloodthirsty. In some instances they are extremely polite, and even kind, and quite rival our highwaymen of Hampstead Heath and Hounslow in bygone times. In the present instance they expressed great delight with Mr. Russell's watch, which, they said, would be highly appreciated by their commodore. In the

course of the evening one of them brought it back, not for the purpose of returning it to the owner, but to take lessons from him in winding it up! Having kept the missionaries close prisoners all night, they put them into a small boat next morning and sent them away; but before this a box of tea was sent to them as a present from the leader of the band! For all this kindness and politeness a heavy recompense was awaiting them.

It soon became known that the rendezvous of the pirate fleet was at a place called Shie-poo, a few miles south from Chusan; and in this place the "Bittern" found them a few days after the robbery of the missionaries. The brig was accompanied by the steamer "Paou-shan," a vessel bought by some Chinese merchants for the protection of their junks a short time before. The pirates, who had watches on every headland, and runners all along the coast, were fully aware of the intentions of our men-of-war. But they had upwards of twenty vessels, all heavily manned and armed, and, as the entrance to the bay in which they were at anchor was extremely narrow, it appeared to them impossible for a vessel like the "Bittern" to attack them with the slightest chance of success. Their own authorities on shore were treated with supreme contempt, and the people in the towns and villages adjoining were told of the fate which awaited the foreign ship of war, should her commander be foolhardy enough to make an attack upon them. And certainly,

looking at the number and size of their junks, their heavy armament, and the position they occupied, there seemed little chance for a ten-gun brig. The first broadside from the junks, properly directed, would have disabled or sunk her and rendered all future efforts of her crew of no avail. But Captain Vansittart and his brave officers and crew were not alarmed by the apparent strength of the enemy. With consummate skill the "Bittern" was towed by the steamer into position, and so near the junks that the shower of shot with which she was received mostly passed over her hull and through her rigging. The steamer after performing this service was directed to fall back out of range, in order to be ready for any emergency which might happen.

It was now the "Bittern's" turn, and her first broadside must have astonished the pirates. Every shot told upon the unfortunate fleet with fearful precision; junk after junk was disabled or sunk; the men panic-stricken rushed into the water or to their boats and fled to the shore, and hundreds were killed on board or drowned in an attempt to escape. In a very short space of time there was scarcely a junk in all the fleet—apparently so powerful and confident a few hours before—but what was sunk or disabled.

Every hill and headland on the shore, from which a view of the action could be had, was crowded with people, who must have been surprised with the extraordinary results which they

witnessed. Some of these persons were no doubt pirates themselves or friends of those who were on board of the fleet, which had just been dispersed, but the greater part were respectable inhabitants who were thankful their coasts had thus been rid of a most intolerable nuisance.

About two or three hundred of the pirates who had escaped to the shore kept together for their safety and protection. Had they not done so the authorities and people would soon have fallen upon them and destroyed them. These infatuated men fled to an enclosed piece of ground on the side of a hill, and dragging up some guns with them endeavoured to place them in position for their defence.

When the mandarin on shore saw the turn things had taken he pretended to be greatly alarmed, and informed Captain Vansittart that in so far as he, the mandarin, was concerned matters were now worse than before. "For," said he, "the pirates were then at sea, and would have left us in a short time, but now you have driven them on shore where they will commit all kinds of atrocities, and I am unable to control them." But it was not the intention of the English commander to leave things in this state. As soon, therefore, as the piratical fleet had been taken, orders were given to land a sufficient number of men to attack the stronghold on shore.

The Chinese do not understand the art of war —either at sea or on shore. They like what they

call fair fighting, that is, for the attacking party to come manfully up in front and receive a broadside from guns which are all ready loaded to receive them. Before Chusan was taken the second time, during the last year, the Chinese had a strong battery thrown up, which commanded the whole of the harbour. They naturally thought that our ships would come quietly into this place, one by one, and be sunk without much resistance. But the commanders of the expedition did not view things in this light, and, although brave enough, did not see the necessity of exposing the lives of their men unnecessarily. Orders were, therefore, given to land the troops in a bay to the westward and march them over a hill there, which thus brought them in the rear of the enemy instead of in his front. The immense battery of the Chinese was thus rendered useless, and the troops behind it were thrown into confusion at once, and fled from the field. In aftertimes, when we were at peace with China, the natives used often to tell me about this manœuvre; and although they laughed heartily at it, yet they shook their heads, and said it was not fair to fight in that way.

The Shiepoo pirates, as ignorant of the art of war as the Chusan mandarins, appear to have expected that the crew of the "Bittern" would be foolish enough to attack them in front, and placed all their guns accordingly. As soon as this arrangement was observed orders were given to

avoid attacking in front. The men therefore scrambled up the hill-side, and thus were enabled to gain a position where the guns of the pirates could not be brought to bear upon them. This manœuvre was perfectly successful, the pirates fled from their stronghold in confusion, many of them were shot by our seamen and marines, while those who escaped from them were captured by the natives and the mandarins. And thus ended one of the boldest and best-managed expeditions against pirates on the Chinese coast. In an attack of this kind it could scarcely be expected that the "Bittern" could come out without some disaster. The master, an excellent officer, was killed while on the bridge of the steamer engaged in towing the brig into position, and three of the crew who were working a gun were severely wounded by a shot which had been better aimed than the rest, and struck the bulwarks.

In coming up the coast in one of the Peninsular and Oriental Company's steamers we met the "Bittern" with the steamer "Paou-shun" and a captured junk coming out of the Shiepoo Bay. The brig hoisted signals, and inquired whether we would take the wounded men on board and convey them to Shanghae, to which we were bound direct. Captain Jamieson, the master of the steamer, readily agreed to do what he was requested by Captain Vansittart; the poor fellows were brought on board in charge of Dr. Gordon, the surgeon of

the brig, and we conveyed them tenderly and safely to our destination.

But little more of this story remains to be told. The Ningpo missionaries got back their boat and a portion of the property which had been stolen from them by the pirates. The guild of Chinese merchants at that place—to their honour be it recorded — subscribed a handsome sum for the support of the relatives of the master of the "Bittern" who fell in action, as well as for those who had been wounded.

Nor were the English merchants behind their Chinese brethren in showing how highly they appreciated the conduct of Captain Vansittart on this occasion. A handsome subscription was raised to be presented to him in the manner most agreeable to his feelings. The generous-hearted sailor, although he appreciated highly the kindness thus shown to him, wanted nothing for himself, but suggested that the sum might be expended in the erection of an ornamental stained-glass window in the church of his native village.

CHAPTER XXI.

Return to the interior — Curious superstition — Adventures with a priest — Journey in search of new trees — Mountain scenery — New Rhododendron — Valley of the nine stones — Fine trees — Yew and golden pine — Curiosity of the natives — A dark and stormy night — We lose ourselves amongst the mountains — Seek shelter in a hut — Alarm of the inmates — Morning after the storm — Return to Ningpo — A fine new plant discovered — Adieu to the north of China — Engage scented-tea makers, &c., at Canton — Sail for India — Complimentary letter from Lord Dalhousie — Ordered to visit the tea-plantations in the Himalayas and Punjab — Return to England.

On reaching Ningpo I lost no time in proceeding onward to the interior of the country, in order, as I have already said, to wind up matters with the natives in various parts who had been assisting me in procuring supplies of plants, seeds, and other objects of natural history.

In going up one of the rivers at this time I observed the effect of a curious superstition which both amused and surprised me at the time. Every one knows that nearly all the junks and boats of China have eyes carved or painted in the bows. I had observed them on all parts of the coast, and had often heard the reason said to be given by the Cantonese, namely, "Suppose no got eye, how can see?" but I did not imagine that any one was so

superstitious or ignorant as to fancy that these junks or boats really could see with the eyes which had been given to them. It seemed, however, that I was mistaken. As I was sailing slowly onwards one of my boatmen seized his broad hat, and, rushing past me to the bows of the boat, placed it over one of the eyes. Several other boats in company were also blinded in the same way; some with hats, others with coats, cloaks, or anything that came readiest to hand. I did not understand this proceeding at first, but soon found out the cause. A dead body was floating up the stream with the tide, and if the boat is allowed to see an object of this kind some evil is sure to happen to the passengers or crew before the voyage is over. Such is one of the superstitions of the Chinese, and hence the reason for covering up the eyes of the boats in order that they might not see.

About the end of October I found myself once more in front of the old temple of Tsan-tsing, which I have already noticed in these pages, and met there the same priests and the same travelling tailor. The priests here seemed to me the most ignorant, lazy, and imbecile I had ever met with in any part of China. They spend their days in perfect idleness, sitting for hours at a time basking in the sunshine, or under the verandah of their dwellings when the sun's rays are too powerful to be thus exposed. They seemed to be in a kind of dreamy, mesmeric state; their eyes indeed are

open, but apparently they see nothing that is going on around them.

On my arrival the tailor was working in the room which I had formerly occupied. The high-priest was sitting on a bed adjoining looking at him, but it seemed doubtful from his appearance if he saw either the tailor or his needle. For hours he remained in the same position, and then fell sound asleep until dinner-time. Several other priests were reclining on chairs, or wandering listlessly about the verandahs or courts of the temple. The only beings who seemed to have life in their veins were the tailor, the cook, two boys, and several ugly-looking dogs.

And thus the priests in this temple go on from day to day—from childhood to youth and from youth to old age—until the "last scene of all" takes place, when they sink into the grave, having as they believe accomplished the object for which they were sent into the world.

Buddhism must surely have greatly degenerated since the days when it was first promulgated. It could not be by the exertions of men such as these that this form of religion was extended over half the world and obtained such a footing in a country like China, where even the Christian faith with its many able and zealous preachers can find so few converts.

The room which I occupied was furnished with two bedsteads, a small table, and three or four chairs. Behind it was another room, which could

only be entered through the one I occupied, and which was the bed-room of the high-priest. I had just finished dinner about eight in the evening, when this gentleman presented himself, and politely informed me he wanted to go to bed. To this arrangement, as a matter of course, I had no objection, being very tired, and therefore anxious to get rid of him for the night. I therefore rose from my seat in order to allow him to pass on to his own room. When he got to his door he found it locked, and commenced looking in every conceivable place for the key. He held in his hand two strips of bamboo, which he used instead of a candle, and which gave out a large body of flame accompanied with smoke, and soon filled the room, and rendered the atmosphere very disagreeable. To make matters worse, every now and then he snuffed the ends of the bamboo with his fingers and threw the red-hot charcoal on the floor. After he had looked in every drawer and in every odd corner of the room three or four times over, muttering to himself while he did so something about the loss of his *ya-za* (key), he left me for the purpose of looking for it outside in some other part of the building.

In about half-an-hour he returned and told me a second time he wanted to go to bed. "Have you found your key, then?" I asked him. No, he had not found his *ya-za*; and then he commenced the search in the same places and in the same listless and stupid manner as before. I began to think he would fall into a state of somnambulism and go

on with his search all night long. Again my room was filled with smoke, again the floor was strewed with burning charcoal, and as I was thinking of retiring to rest, this state of things was far from being either pleasant or agreeable. I therefore ventured to remonstrate with him and to call his attention to the fact that as he had searched all these places several times already, it was a loss of time to search there again. His only reply to my remonstrance was uttered in a doleful, dreamy tone—"My ya-za! my ya-za! I have lost my ya-za!"

At last he seemed to awake all at once from his dream, and turning round to me with a good-humoured smile upon his countenance, he said, "Well, I cannot find my key; but, never mind, there are two beds in this room, and as you can only occupy one of them, I shall take the other." This proposition, although perfectly fair, and one that I could scarcely object to, was far more reasonable than agreeable to my feelings. I therefore put in one or two objections in as mild a form as possible. "There are no bedding or clothes in that bed, and you will surely suffer greatly from the cold." This had no effect; he assured me he had plenty of clothes upon him, and that he would sleep very comfortably on the bare bed. "Well but," said I, laughing, "are you not afraid to sleep in the same room with a pah kwie-tze (white devil)?" It may be remembered that this was the man who appeared to dread me so much on our first acquaint-

ance. All his old fears seemed instantly to return, the smile left his countenance, and he gave me a look which told plainly enough that I had struck the right chord in order to gain my object, and that he would be as averse to sleeping in my company as I was to his. "Ah!" said he, "my ya-za! I have lost my ya-za!" and commenced the search as before.

It was now getting very late, and as I had a long journey in view for the following day, my patience was completely exhausted. I therefore rose from my chair, and, putting my hand on his shoulder, said, "Come with me and I shall find you a bed for the night." Leading him out of my room, we proceeded across the hall to one occupied by another priest, at whose door we now knocked, and who readily admitted us. "Here is your superior," said I; "he has lost the key of his bedroom; pray give him a bed in yours, and make him as comfortable as you can until the morning." Leaving the two Buddhists to explain matters in their way, I returned to my own room, bolted the door, and went to bed. Nothing occurred during the succeeding part of the night to disturb my slumbers.

It was now the end of October, and the weather was cool and pleasant. When I awoke at daybreak on the following morning I found the atmosphere clear, and the sky without a cloud; everything gave promise of one of those glorious days which are common in the north of China at this season, particularly amongst the mountains. My

servants and myself were early astir, having a long journey in prospect for the day. The object I had in view was to obtain various kinds of seeds, more particularly those of the "golden pine-tree" (*Abies Kæmpferi*), which I have already noticed in these pages, and which I had searched for in the previous season without success.

Taking an early breakfast, we ascended the pass behind the temple, and soon reached the vale of Poo-in-chee and the little village of that name. Here I observed for the first time two very fine yew-trees, which apparently were quite new. They evidently belonged to the genus *Cephalotaxus*—a genus perfectly hardy in England, and very highly prized. They were too young to have seeds upon them, and too large to dig up and carry away. While my servant and myself were looking at them, the person to whom the garden belonged came out and very kindly gave us their name and history. He told us he had received the seeds from a place about ten or fifteen miles distant amongst the mountains, where the trees grew to a great size and produced seeds annually in considerable abundance. It is called Fee-shoo by the natives, and its seeds are to be found in a dry state in all the doctors' shops in Chinese towns. They are considered valuable in cases of cough, asthma, and diseases of the lungs or chest. I am not aware that their seeds are known to English doctors in China, or if they are considered by them of any value.

Being very anxious to procure vegetating seeds of this fine tree, I offered a considerable sum to one of the villagers of Poo-in-chee providing he would go with us and act as our guide through the mountains. The person who had been giving us the information above intimated his readiness to accompany us, but suggested that instead of starting then it would be better to put off the journey until the following day, when we could start by daylight. But the day was yet early and fine, and I was determined to proceed at once. By a little coaxing our guide was induced to swallow a hasty meal and accompany us on our journey.

Our road led us over the highest ridges of the mountains, which are here fully three thousand feet above the level of the sea. The tops of these mountains are so cold in winter that nothing but an alpine vegetation can exist;—the strange tropical-looking forms, such as the bamboo, the Chusan palm, and plants of that kind met with at a lower elevation, give place to wiry grass, gentians, spiræas, and other hardy plants of a like description. Here and there on our journey we came upon fine examples of the golden pine-tree (*Abies Kæmpferi*) growing a little way down on the mountain-slopes. *Cephalotasus Fortunei* and *Cryptomeria japonica* were also found at high elevations.

In a romantic glen through which we passed on our journey I came upon a remarkably fine-looking rhododendron. A species of the genus (*R. Championæ*) had been discovered on the Hongkong hills,

but none had previously been met with to the northward, although the azalea is one of the most common plants on the mountains of Chekiang, I therefore looked upon the present discovery as a great acquisition, and as the plants were covered with ripe seeds, I was able to obtain a good supply to send home. All the Chinese in that part of the country agreed in stating that the flowers of this species are large and beautiful, but as all rhododendrons have this character, it is impossible to predict what this one may turn out to be until we have an opportunity of seeing its flowers. Mr. Glendinning, of the Chiswick nursery, to whom I sent the seeds, has been fortunate enough to raise a good stock of young plants, which are now growing vigorously, and which will soon determine the value of the species.

Our journey was long and toilsome; sometimes we were on the top of the highest ridges, and at other times we seemed to go down and down until we were nearly on a level with the sea. But the views of scenery, which were ever shifting as we went along, were grand in the extreme, and richly rewarded us for all our toil. While on the tops of the highest ridges we looked round upon barren mountains, which lay about us like the waves of a stormy sea, and here and there we got glimpses of the distant and fertile plain of Ningpo stretching far away to the eastward. At other times our way led us through pleasant and secluded valleys, each of which looked like a little world of its own, shut in

by rugged mountains, and having no connexion with the great world outside.

Although the tops of the mountains here were generally barren and uncultivated, yet I observed crops of Indian corn growing to a very considerable elevation, and it was now ripe. Down in the valleys the land was very rich, and nearly all under cultivation. The natives of these districts prefer living in the valleys, which are sheltered by the surrounding mountains from cold and cutting winds. Many temporary huts were met with at high elevations, but these were merely used in the summer-time and while the crops of Indian corn were ripe. No one appeared to think of living in such places during the winter.

The natives with whom we came in contact during our journey seemed a hardy, industrious race, and hospitable and kind in their habits. We were often asked to enter their cottages, when we were presented with tea, roasted Indian corn, or anything they might chance to have for themselves.

About four o'clock in the afternoon we reached the "Valley of the Nine Stones," to which we were bound. Here we found a pretty little town situated on the banks of a small stream which takes a winding course through the mountains to the eastward, and eventually falls into one of the branches of the Ningpo river. Our guide pointed with great satisfaction to numerous fine trees of the new yew or *Cephalotaxus*, which were growing on the sides of

the hill above the town. Many of them were from sixty to eighty feet in height with fine round heads, and altogether had a striking and ornamental appearance. There were no seeds to be seen on any of them, but our guide informed us they had been lately gathered, and were still in the town, where we could purchase them. Some noble trees of the "golden pine" were also met with here, and, to my delight, were loaded with ripe cones. When ripe, these cones have a rich yellow hue, which probably suggested the name by which this fine tree is known amongst the Chinese. I look upon this tree as the most important of all my Chinese introductions. It grows rapidly, produces excellent timber, and will eventually become a striking and beautiful object in our English landscape.

While engaged in making observations upon these trees I was on the hill-side above the town, and consequently fully exposed to the natives. The news of a stranger and foreigner being in this secluded place seemed to fly from house to house with the rapidity of lightning; in less time than I can describe it every door, verandah, and window was crowded with anxious faces gazing intently up to where I was standing. Some few, more impatient than their neighbours, came running up the hill in order to have a nearer view, and several respectable-looking persons in the crowd asked me to go to their houses and drink tea. Every one treated me with marked civility and even kindness.

But the day was now far spent, and my servants and guide knowing better than I did the difficulties of our homeward journey by night, begged me to look after the seeds without delay. They also pointed out a man who owned a number of trees, and who had a large quantity of the seeds for sale. We therefore followed this man to his house, and found he had just commenced to clean and dry these seeds for the Ningpo market. It was difficult to strike a bargain as to price, but this was done satisfactorily at last, and the owner engaged to deliver them at Ning-kong-jou in three days. Large quantities of the seeds of the "golden pine" were also contracted for in the same way; these are now growing in Mr. Glendinning's nursery at Chiswick. Upon the whole I was highly satisfied with the results of our visit to the "Valley of the Nine Stones."

After drinking a cup of tea with the hill farmer —for such he was—we made our adieus to the crowds of villagers and turned our faces homewards. But it was now nearly five o'clock in the afternoon, and being the end of October it was almost dark. The day too, which had been hitherto so fine, was now overcast; a thick mist came rolling down the sides of the hills, and it began to rain. Onward we trod for many a weary mile, sometimes missing our way, and having to retrace our steps, while at other times we proceeded with painful uncertainty as to our being in the right road. At last our guide came

to a dead stand, and confessed he did not know where he was; nor was this to be wondered at in the thick mist and darkness which surrounded us. What to do next was now a most serious and anxious question, and one most difficult to answer. Our guide recommended us to remain where we were, and suggested that the thick mist might possibly clear away and enable him to make out some familiar landmark. We were far above the level of any of the villages which are scattered over these hills, and had no hope of obtaining shelter unless we could stumble upon one of those temporary summer huts erected by the farmers, who cultivate Indian corn on the higher lands. Drenched to the skin, and cold, we now endeavoured to obtain shelter from the wind and rain on the lee side of a large projecting granite rock, and remained in this comfortless position for more than an hour.

As the mist chanced to lift a little, our guide, who was anxiously looking out, fancied he discerned a light at no great distance. This soon became more clearly visible, and we gladly moved on towards it. It turned out to be shining from a miserable hut, such as I have already noticed, and was occupied temporarily by an old woman and a boy, for the purpose of getting in their crop of Indian corn. But "any port in a storm;" and I looked on this miserable hovel with more thankfulness than I had done on many a snug and comfortable inn at home.

In order to alarm the inmates as little as possible, our guide went first, and the rest followed close behind him, in order to get in before the door was shut and barred in our faces, a proceeding which we thought not improbable if those inside became alarmed. The guide knocked at the door, told his name, and said he was a native of Poo-in-chee, who had lost his way amongst the mountains, and sought shelter from the wind and rain. When the door was opened we took care that it should remain so until the fears of the inmates were quieted. The moment the old woman saw a foreigner she manifested the greatest signs of alarm, and retreated to the farthest corner of the building, at the same time pulling her little boy along with her. In vain I seconded my guide and servants in their efforts to convince her that she had nothing to fear; I was a "white devil," and that seemed to be the only idea she would allow to take possession of her mind.

In other circumstances I would have gone away and left the old lady to recover her composure; but this was at present almost impossible. After, therefore, assuring her for the last time that she had nothing to fear, we drew near to the fire and gladly warmed ourselves. In a little while the boy began to be more friendly, and eventually the old woman herself came out of the corner and threw some fresh wood on the fire. The "ice was now broken," and our friendship was further cemented by the present of a few cash, which

were thankfully received, and which tended to raise us not a little in the estimation of our hostess and her child.

The air of the mountains, cold and damp as it was, had given us an appetite, and we were all ravenously hungry. We therefore suggested to the old woman the propriety of selling us some heads of her Indian corn. These we roasted at the fire, and enjoyed our simple fare with greater zest than we had ever done a most sumptuous dinner. When our dinner was over, we collected a quantity of dry straw, which the hut afforded, and spread it thickly down before the fire. Tired and weary as we were, it was not necessary that we should seek repose on a bed of down. Dry straw was a luxury in our present circumstances, so we lay down and soon forgot all our cares in the land of sleep and dreams.

When we awoke on the following morning, broad daylight was streaming in upon us through the sides and roof of our temporary dwelling. The storm of the preceding night had passed away, the sky above head was clear, and everything gave promise of a beautiful day. The view from the door of our hut was grand in the extreme. We were high up on the side of a mountain; on the opposite side, to the westward, there was another mountain of equal height, while between the two lay a deep and richly cultivated valley, with a small stream gliding smoothly onward down its centre. A misty cloud hung

here and there lazily on the sides of the hills, which only had the effect of making the sky look more clear and the scene around and below us more grand and lovely.

We now gave our hostess and her boy a small present for the inconvenience we had put them to, and amidst their best wishes we resumed our journey, which we had been obliged to abandon the evening before. Without having any further adventures of interest, we arrived in safety at the old temple of Tsan-tsing.

On the day following I went down to the plains and onward to Ningpo. In the garden of an old Chinese gentleman here, I met with a beautiful new herbaceous plant, having rich blotched or variegated leaves, which has since been named by Dr. Lindley, *Farfugium grande*. It was growing in a neat flower-pot, and was evidently much prized by its possessor, and well it might, for it was the most striking-looking plant in his garden. He informed me he had received it from Peking the year before, and that at present it was very rare in Ningpo, but he thought I might be able to procure a plant or two from a nurseryman in the town to whom he had given a few roots. I lost no time in paying a visit to the nursery indicated, and secured the prize. It has reached England in safety, and will shortly be a great ornament to our houses and gardens.

I had now brought my work in China to a successful termination. Many thousands of tea-plants,

obtained in the finest districts, had reached their destination in the Himalayas, and had been reported in good condition by Dr. Jameson, the superintendent of the Government plantations; abundant supplies of implements used in these districts had also been sent round, and two sets of first-rate black-tea manufacturers from Fokien and Kiangse had been engaged, and were now on their way to the north-west provinces of India. In accordance with instructions received from the government of India, I had also introduced many of the useful and ornamental productions of China, such for example as timber and fruit-trees, oil-yielding plants, dyes, &c. These things were sent partly to the Government gardens and partly to the Agricultural and Horticultural Society.

I now bade adieu to many kind friends in the north of China and sailed for Hongkong and Canton. With the assistance of Messrs. Turner and Co., I succeeded in engaging some scented-tea men and lead-box makers, and took them on with me in the steamer "Lancefield," to Calcutta, where we arrived on the 10th of February, 1856. Here I had the pleasure of receiving a despatch from Mr. Beadon, Secretary to the Government of India, containing the following paragraph:—"I am directed to acknowledge the receipt of your letter No. 25, dated the 11th instant, and to state that the Most Noble the Governor-General in Council entirely approves of your proceedings,

and considers the results of your mission to China to be very satisfactory." I need scarcely say that a compliment of this kind from Lord Dalhousie was most grateful to my feelings; for next to the pleasure which one feels who has accomplished a difficult object is that of knowing that his exertions are appreciated.

Having thus terminated the Chinese part of my labours, I was requested by the Government of India to proceed once more to the North-west Provinces and the Punjab, for the purpose of inspecting the various tea-plantations there, and to make a report upon their present condition and future prospects. This report, which was sent in to the Government in October 1856, shows the tea-plantations in the Himalayas and Punjab to be in a very satisfactory condition, and likely at no distant day to prove of great value to the natives of India.

On the 9th of November I left India in the Peninsular and Oriental Company's ship "Bentinck," Captain Caldbeck, and reached Southampton on the 20th of December, having been absent from England exactly four years.

CHAPTER XXII.

Dispute with the Chinese about the lorcha "Arrow" — Lorchas and their crews — Abuse of the English flag — Right of entrance into the city of Canton — The Chinese outwit us in diplomacy — True causes of our position in Canton — We have ourselves to blame — The policy which ought to be pursued — The city of Canton must be opened — Foolish restrictions on foreigners and their trade ought to be abolished — Direct communication with the court of Peking — Method of carrying out these views — Remarks on the climate with reference to the health of our troops — Conclusion.

THE narrative of my travels in China ends with the last chapter, and in ordinary circumstances that chapter would have been the last in this work; but since I left Hongkong a disturbance has broken out at Canton of a most serious kind, which day by day assumes a more important aspect, the end of which is most difficult for those even who are best acquainted with China and the Chinese to foresee.

It is not my intention in this place to attempt a history of the original cause of the dispute in so far as the unfortunate lorcha "Arrow" is concerned, or to express my opinions on a subject upon which the highest legal authorities in England cannot agree. It is sufficient for me to refer the reader to the despatches of the English and Chinese authorities in China, and to the speeches

which have been delivered in Parliament for information upon this subject. But whether we may be right or wrong in a legal point of view I doubt much whether it be good policy to allow such vessels as this "Arrow" to fly the English flag. Every one who has travelled much on the coast of China knows well what the majority of these "lorchas" are. And here, perhaps, I had better endeavour to give some information on this point to those who have not had an opportunity of seeing and judging for themselves.

Lorchas are not English vessels, as some people appear to imagine, and are rarely owned or sailed by Englishmen. They are Portuguese vessels, and were originally built at Macao, although of late years a few have been built at Ningpo and some of the other ports on the east coast. They fly the Portuguese flag, have Portuguese papers, and are numbered and registered by the government of Macao. They are manned, almost without exception, by Chinese—natives of Macao, Canton, and adjacent ports in the south of China. Nominally they are commanded by Macao-Portuguese, but the Chinamen always seemed to me to have the chief control of the vessels. The few owned by Englishmen, which fly the English flag and have English papers, are sailed just in the same way, the only difference being that the latter may boast of an English "captain."

A few of these lorchas are common traders on the coast, particularly in the south, about

Macao, Canton, Hongkong, and Amoy, but by far the greater number have been engaged of late years in convoying Chinese junks from port to port and protecting them from pirates. When I was last in China a fleet of them was chartered by the mandarins and sent up the Yang-tse-kiang to attack the rebels at that place and Nankin, but in this instance they did not seem very successful. They have often been accused of committing acts of piracy on the coast, and stringent measures have been taken by the Macao government at various times to keep them in order. Generally they are very heavily armed, and have a most formidable-looking appearance.

These vessels, whether in convoying or in simple trading, do not confine themselves to the five ports at which foreigners are permitted by treaty to trade, and are well known both to the Chinese government and to foreigners as inveterate smugglers. Oftentimes the peaceful inhabitants in the little towns on the coast have complained bitterly to me of the lawless and tyrannical acts of their crews.

Such, then, is the class of vessels to which the "Arrow" belongs. Is it right that they should be allowed to sail under the English flag without our government having means to control the lawless acts of their crews? These vessels, as I have already shown, visit and trade at hundreds of places on the coast where bona fide English ships are not allowed. Are these crews to be allowed

to commit all sorts of offences against their own government and people and then point to the flag of England—that flag which as Englishmen we proudly look up to as the emblem of liberty and justice—as their protection and as their warrant? This may be in accordance with treaty rights—it may be the law of the case—but it scarcely accords with what reason suggests or common sense. It therefore appears to me to be bad policy on the part of the local government of Hongkong to grant permission to fly the English flag to lorchas or native boats manned by Chinese over whose actions, when away from that port, it has no control.

But as we watch the dispute in question the scene suddenly changes, another act commences, and the lorcha falls into the back-ground. It is no longer satisfaction for the insult offered by the government of China, or rather Commissioner Yeh, to the English flag only which is demanded. It is now discovered that this is a good opportunity for insisting upon our treaty-right of entering the city of Canton. There can be no doubt that we are fully entitled to this privilege, and have been so since the Treaty of Nankin was signed, at the close of the last China war, but it is extremely doubtful that his Excellency Yeh had the power to grant a right, without a reference to the Court of Pekin, which had been allowed to stand so long in abeyance.

It has often been remarked that in everything

the Chinese are exactly the reverse of European nations, and here is a fresh proof that the remark is, to a certain extent, a just one. As a nation they cannot fight, but they are first-rate diplomatists; on the other hand, we can win our battles and then allow ourselves to be outwitted by the diplomacy of a nation whom we despise in the field.

In 1842, after taking most of the important maritime cities of China, from Hongkong as far north as Nankin, we made peace with the government upon condition that five ports, namely, Canton, Amoy, Foo-chow, Ningpo, and Shanghae, should be opened to foreigners of every nation for the purposes of trade. Scarcely was this treaty signed before the right of entrance to the city of Canton was disputed by the Chinese, and then we committed our first and greatest mistake in not enforcing it. Some years afterwards the demand was made again by Sir John Davis, who in order to enforce it destroyed many of the forts in the river with the fleet then at his disposal in the Chinese waters. But the Chinese Commissioner of that day did by clever diplomacy what he found impossible by force of arms. He induced Her Majesty's Plenipotentiary to put the evil day off for two years on account of the prejudices of the people; at the end of that period our countrymen would be received with open arms by the loving Cantonese! The Imperial Commissioner knew well enough that at the end of two years

the difficulty would just be the same as it was then, but ere that time another officer would have to deal with it, and he himself would get the credit of duping the English out of the city of Canton.

I must confess that the arrangement we made at that time took me completely by surprise. Having a pretty good knowledge of the Chinese character I knew perfectly well that at the end of two years we would be as far from the city of Canton as ever we had been, and the events which have taken place since that time have proved the correctness of the opinion which I then formed.

Not only have we allowed ourselves to be outwitted by Chinese commissioners but we have suffered much in the eyes of the people of China by first making these demands and then allowing them to be evaded. It may be all very well to say that we did so from compassion for a weak power, or semi-civilized nation; the Chinese, full to the brim of self-conceit, put it down to fear. With a nation like the Chinese our demands should be well considered before they are made, but once we have made them they ought to be enforced.

Were the city of Canton open to-morrow few persons would ever visit it except for the purpose of calling upon the officers of government. The finest streets and shops are all outside the walls, and the city itself, from all accounts, possesses but

few attractions. But although this is the case the vexed question has assumed an importance not its own, and it is really absolutely necessary now that we force a compliance with our demands if we mean that the lives and property of our countrymen should be safe and commerce go on.

Had we enforced our treaty-rights at first all this would have been avoided, much blood would have been spared, and the Canton Chinese would have treated us with more civility and respect. When the port of Foo-chow-foo, the capital city of Fokien, was opened to foreign trade, an effort was made by the authorities there to prevent us from having a footing in the city. Our consul, the late Mr. Lay, alone and unaided, forced his way through the gates and took up a temporary residence in a joss-house within the walls. The mandarins, finding *one man* determined to secure our treaty-rights, gave up the point, and never afterwards objected to our having the consulate in the city. Had a little of such spirit and determination been shown at Canton, and supported by a sufficient force, this vexatious question might have been settled long ago.

In making treaties with a nation like the Chinese we ought not to look upon them as we do upon the more civilized nations of the west. They cannot appreciate our motives of clemency or consideration. During the last war we spared Canton when it lay entirely at our mercy, and the Cantonese to a man gave it as their opinion that

we were afraid to attack it. Again, according to them, it was fear which prevented us from insisting upon our treaty-rights as regards free admission within their city walls.

It would appear, therefore, that we have ourselves to blame for much of the barbarous treatment we have received at the hands of the Canton Chinese.

But putting on one side the case of the unfortunate lorcha "Arrow," about which our "doctors differ," there seems to be little doubt that our relations with the Cantonese were upon a most unsatisfactory footing, and that sooner or later the "good understanding" existing between us would have been disturbed. It was only a question of time, and it has been decided somewhat prematurely, perhaps, by this supposed insult to the English flag and infraction of treaty-rights. Our relations with the people and government of Canton can never be considered on a satisfactory footing until we have a full and complete understanding with each other. They must be taught to look upon us as a nation as highly civilised and as powerful as themselves. Until this is accomplished we may have a disturbance at any time; our commerce may be stopped, and what is of far more importance, the lives of our countrymen living in this remote region may be placed in imminent danger.

Whether we were right or wrong, therefore, at the commencement of this unfortunate dispute, it

is now absolutely necessary for us to carry it through until our relations are placed upon a firm and satisfactory basis. It may seem fair and plausible for persons ignorant of the Chinese character to talk of justice and humanity—fine sounding words no doubt—but totally inapplicable to the present state of things. Suppose we were now to go down on our knees to Commissioner Yeh, acknowledge our fault, crave forgiveness for the past, and promise to behave better for the future, what would be the result? Is it to be supposed for one moment that this worthy functionary would view such conduct in a proper light, or that the thousands of Chinese under his rule would give us credit for the feelings by which we were actuated? Most assuredly not. The "barbarians," or the "foreign devils," would be again accused of fear, or, what is worse, of cringing to the Cantonese in order that our trade might be allowed to be carried on. By such a proceeding we should place ourselves upon the top of a mine which might be sprung at any time. There would be no security for life or property in Canton, and eventually a war would be forced upon us more disastrous than what may happen at the present time.

In order, therefore, to be humane in the strictest sense of the term, to prevent future war and bloodshed, to give the Cantonese a true estimate of our character, to render the lives and property of our countrymen secure, and to prevent those

vexatious interruptions to our commerce, we must carry out what we have begun with a firm and determined hand. With a nation like the Chinese, particularly about Canton, this is true humanity and mercy.

But the question "What do we want from the Chinese?" naturally presents itself, and what points in a new treaty ought to be insisted upon in order to guard against and if possible prevent, future disturbances between us and them. We must have free entrance into the city of Canton, however unimportant this may be; and not for our officials only, *as they themselves have suggested*, but for our merchants, missionaries, or any one who chooses to go, just as we have at the other five ports which are now open to our trade. Our officials must be received by Chinese officers of equal rank on all occasions when any important business is to be transacted.

If possible, and I do not see anything to prevent it, all those prohibitory regulations as regards our trading at certain ports only, and going only a certain distance into the country, ought to be swept away. These regulations appear to have been framed upon the supposition of our being a barbarous race, foreign devils, and wild animals, which it is necessary to cage up to secure the safety of the civilized Chinese. The sooner such regulations are abrogated the better it will be both for the Chinese and ourselves.

And, lastly, means ought to be taken to have

direct communication with the court of Peking, either by means of an ambassador or occasional resident. The Chinese cannot remain much longer isolated from the rest of the world, nor does it seem desirable that they should be so. With the Russians stretching eastward on the banks of the river Amoor, the Americans in California, ourselves in India, and fleets of steamers traversing the sea which washes the shores of this vast empire, isolation for any length of time seems out of the question.

To bring the Chinese within the pale of nations, to extend our commerce, and to open up the country to missionary labour and scientific research, are objects worthy of the earnest consideration of statesmen, not only in England but also in France, America, and in other civilized European countries who are interested in the welfare of mankind.

Supposing that the present time is suitable for the consideration of this important subject, the question as to how it ought to be commenced and carried out naturally presents itself. That the Government of China will offer many objections to the plan may easily be predicted; but the same force which it will be necessary to employ to place our relations on a temporary footing will be sufficient to gain these most desirable results, providing we do not allow ourselves to be outdone *once more* in diplomacy.

If we are ever to have a permanent peace with

the Cantonese, if our trade is to be carried on peaceably, and if the lives and property of our countrymen there are to be secured, the pride of the Chinese officials must be humbled, and the rabble mob in that city must be taught that they cannot insult us with impunity. In the last war this guilty city escaped, while we punished the unoffending inhabitants of the cities to the north, such as Amoy, Ningpo, and Shanghae. We can scarcely commit such an error a second time. If we must punish it seems but just that the chief part of that punishment should fall upon the guilty.

It appears to me to be useless, and only a waste of time to attempt negociations with a man like Commissioner Yeh. Even if he had the will to agree to our terms he has not the power. We must communicate directly with the Court of Peking; and to have influence there we must be backed with an imposing force to compel a compliance with our demands.

The best and easiest way to accomplish the object in view would be to reoccupy the island of Chusan. This island might be taken without much loss, and while the city of Ting-hae and the adjoining suburbs would afford shelter to our troops, our fleet might rendezvous in its beautiful and commodious harbours. This island is more healthy than Hongkong or any other of the northern ports, and this fact is one of very great importance to the welfare of our troops. It has

always been found in our wars with China that the climate has been much more fatal to our soldiers than the guns of the Chinese.

With a force in Chusan we could easily communicate with the Government of Peking. In the south-west monsoon, from May to the end of September, vessels of large draught can run up to the gulf of Pee-che-lee and anchor at no very great distance from the capital. Later in the year, when the north winds are blowing, this could not be done owing to the shallowness of the gulf.

During the last Chinese war the most vulnerable point attacked was the city of Chin-kiang-foo, a few miles below Nanking. Here the most important inland trade of the empire is carried on by means of the grand canal. But this city has been occupied for some years by the insurgents, and any attack upon it would only serve the ends of the Imperial government. Nor would it serve any good end to meddle with the ports of Amoy, Foo-chow, Ningpo, and Shanghae, providing the inhabitants at these places do not mix themselves up in our quarrel.

It would seem, therefore, that our operations should be directed principally to Canton in the south, and to the capital and towns adjacent in the north. And as these operations are likely to last for some time, I can point to no better place than Chusan as the head-quarters for our troops. They are likely to suffer less here from

the effects of climate than anywhere else, and will have little difficulty in obtaining an abundant supply of fresh provisions.

It is not my intention in these pages to offer any suggestions to the commander of the Chinese forces as to his mode of action.—I know nothing of the art of war,—but as the whole coast of China from Canton to Shanghae, and much of the inland, is well known to me, any information I give is entitled to consideration.

I have already remarked that the climate of the country is much more to be dreaded than the armies of the Chinese, and I shall draw these remarks to a close by giving a description of what that climate is. In all parts of China where I have been, the hottest months in the year are July and August. In the north the heat is very oppressive from the middle of June to the end of August. About Hongkong and Canton the oppressive heat commences a little earlier and lasts longer, although it is not quite so intense as it is further north. My registering thermometer during July and August at Hongkong frequently stood as high as 90°, and one day reached 94° in the shade. In Shanghae and Ningpo the same thermometer used to stand sometimes for days at 100°.

But the hottest months are not the most unhealthy, at least we have not so much sickness then as we have a little later in the season. In September, when the monsoon begins to change,

and when the northerly winds come down, causing a sudden depression of temperature, natives as well as foreigners suffer much from fever and dysentery. The excessive summer heat seems to weaken the constitution, and thus renders it more easily affected by the sudden changes of temperature which occur at this period of the year. *The rivers of China are particularly unhealthy at this season*, a fact which ought to be kept in view by the commanders of our ships of war.

When the monsoon is fairly set in, in October, the climate of Shanghae and Ningpo is as healthy as that of any part of the world. Although the sun is hot during the day at this time, the air is cool and bracing and the nights are cold. In the end of October the thermometer sometimes sinks as low as the freezing point. December, January, and February are the coldest months of the year, the cold then being quite as severe as it is in England. Snow frequently falls, but the sun is too powerful to allow it to lie long upon the ground. Ice of a considerable thickness is formed annually upon all the lakes and canals.

About Canton the winters are much warmer than they are at the more northern ports; the thermometer rarely falls to the freezing-point, and ice and snow are of very rare occurrence. But the climate here, although perhaps not so bracing to a European constitution, seems perfectly healthy during the winter and spring months.

For eight or nine months out of the twelve,

then, it would appear that the climate of China, both in the north and also in the south, is healthy to Europeans, and no doubt these are the proper months for the prosecution of military operations with English troops.

The monsoons in the China sea are not so decided as they are in India, but generally the prevailing winds from the end of April to the middle of September blow from the south-west. During the remainder of the year, northerly and easterly winds prevail. Thus what is called the south-west monsoon blows in summer, and the north-east in winter. Sailing vessels from Europe or India, bound for Hongkong or Chusan, or any of the northern ports, are almost certain to have a fair wind up the China sea from April to September, and *vice versâ*, a fair wind down during the other season. During the months of May, June, July, and August, a fleet of sailing vessels could easily rendezvous at Chusan, or any other point on the Chinese coast, and if necessary come down to Hongkong or Canton in three or four days, in the end of September, when the monsoon changes. But if these same vessels wanted to get from Canton to Chusan at that period, they would find considerable difficulty in reaching their destination.

From the information I have thus given it would appear safe to arrive at the following conclusions. 1st. It is useless to attempt to negociate with a man like Commissioner Yeh: we must have communication with the Court of Peking.

2nd. The island of Chusan is the most suitable point from which we can conduct our negociations, both on account of its position, and as it is the most healthy part of China for our troops. 3rd. If the lives and property of foreign merchants and others are to be safe in Canton, the mandarins and mob must be taught to treat us with more respect. 4th. The other four ports ought to be respected providing they do not mix themselves up in our quarrel with the Cantonese. 5th. China ought to be opened, and all those foolish restrictions imposed by the last treaty on our trade should be swept away. 6. In conducting our operations the nature of the climate ought to be carefully considered with a view to preserve the lives of our soldiers and sailors.

In conclusion let us hope that the day is not far distant, when this large and important empire, with its three hundred millions of human beings, shall not remain isolated from the rest of the world. The sooner this change takes place the better will it be for the Chinese as well as for ourselves. Trade and commerce will increase to a degree of which the most sanguine can form but a very faint idea at the present time. The riches of the country will be largely developed, and articles useful as food, in the arts, or as luxuries, at present unknown, will be brought into the market. It cannot be true that a vast country like China, where the soil is rich and fertile, the climate favourable, and the teeming population industrious

and ingenious, can produce only two or three articles of importance, such as silk and tea, for exportation. There must be many more, and these will be brought to light when the country is fairly and fully opened to the nations of the west.

But when this is accomplished a boon of far greater value will be conferred upon the Chinese than anything connected with the extension of their commerce. The Christian missionary will be able, without fear or restriction, to proclaim the "glad tidings of great joy" to millions of the human race who have never yet heard the joyful sound.

Objects such as these—the placing of our relations on a firm and satisfactory basis, the prevention of unequal wars where much blood is necessarily shed, the extension of trade and commerce, and the free and unrestricted dissemination of the Gospel of Christ—are worthy of the consideration of the highest statesmen and greatest philanthropists of our time.

THE END.

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Thomson,† R. Scott, Esq. Surgeon, ... 1838
Thomson, William, Esq. Merchant, Calcutta, ... 1848
Thornton,† John, Esq. Civil service, ... 1842
Thurnburn,† R. V., Esq. Merchant, ... 1844
Tombs, Capt. Fred., (18th N. I.) Pension Pay Master, 1843
Dinapore, ... 1853
Tonnochy, Thomas, Esq. Deputy-Collector, Bolundshuhur, 1833
Tranter, Geo., Esq. Medical service, Meheedpore, ... 1840
Travers, Capt. J., 2nd in Command, Bhopal Contingent, Sehore, ... 1854
Trevor, Edward Tayler, Esq. Civil service, Calcutta, .. 1840

	Admitted.
Tripp,† H. D., Esq. Indigo planter, ...	1852
Troup, Capt. R., (63rd N. I.) Commandant 2nd Oude Local Infantry, Sultanpore, ...	1849
Tucker, Henry Carre, Esq. Civil service, Benares, ...	1837
Tucker, Henry Carre, Esq. or Secy. for the time being Local Committee, Allahabad, ...	1851
Turnbull† Lieut. A. D., (Bengal Engineers,)	1851
Turnbull, G. D., Esq. Civil service, Bolundshuhur, ...	1853
Turner,*† Thos. Jacob, Esq. Civil service, ...	1836
Turner,† Alfred, Esq. Merchant, ...	1847
Twemlow,† Brigadier George, (Nizam's Army,)	1841
Ulterson, Lieut. E. V., Agra, ...	1854
VARDEN, A. M., Esq. Merchant, Calcutta, ...	1851
Vetch, Major H., (54th Regt. N. I.) Depy. Commissioner of Assam, Gowhatti, ...	1842
Vincent, W., Esq. Indigo planter, Cawnpore, ...	1846
Vizianagram, Meerza Rajah Vizeram Guzputty Rauze Bahadoor, Rajah of, ...	1847
Vos, J. M., Esq. Architect, ...	1847
WALLACE, A., Esq. Merchant, Calcutta, ...	1843
Walters,*† Henry, Esq., ...	1836
Ward, J. J., Esq. Civil service, East Burdwan, ...	1852
Warwick, B., Esq. Calcutta, ...	1849
Warwick,† Chas., Esq. Merchant, ...	1850
Watson,* Robert, Esq. Calcutta, ...	1837
Watson, John, Esq. Merchant, Calcutta, ...	1852
Watson, T. J., Esq. Merchant, Calcutta, ...	1854
Wauchope,† S., Esq. Civil service, ...	1848
Weld, Lt. Geo., Fort Adjutant, Chunar, ...	1851
Weskins, Charles, Esq. Merchant, Calcutta, ...	1854
Wright, H., Esq. Civil service, Shahpore, ...	1854
West, C. H., Esq. Merchant, Lahore, ...	1850
Western, Major J. R., (Engineers) Jullundur, ...	1842
Western, J., Esq. (Horse Artillery) Bangalore, ...	1849
Whampoa, Mr., Merchant, Singapore, ...	1850
Wheeler, Lieutenant G. R. (1st. Regt. N. I.) Peshawur, ..	1853
Whitelock, T. W., Esq. Surgeon, Nizam's Army, Hingolee.	1852
Wienholt, W., Esq. Merchant, Calcutta, ...	1848
Wight,*† Robert, Esq. M. D., Madras Medical service, ..	1836
Wilby, G. R., Esq. Editor of the *Delhi Gazette*, Delhi, ..	1851
William, Fleetwood, Esq. Civil service, Bareilly, ...	1840
Williamson, Lieut. James, (49th Regt. N. I.) 5th Regt. Punjab N. I., Bunnoo, ...	1849

	Admitted.
Willis, Joseph, Esq. Merchant, Calcutta, ...	1827
Wilson, A. G., Esq. Deputy Magistrate, Gyah, ...	1847
Wilson, Thomas, Esq. Deputy Opium Agent, Ghazeepore, ..	1848
Wilson, H. R., Esq. Deputy Collector, Budaon, ...	1852
Wilsone, C. M., Esq. Munglepore, ...	1853
Wingrove,† E., Esq. Merchant, Calcutta, ...	1846
Withecombe, J. R., Esq. Civil Asst.-Surgeon, Darjeeling, ..	1851
Withers, H. H., Esq. Merchant, Calcutta, ...	1852
Wood, J. N. T. Esq. Merchant Calcutta, ...	1854
Wood,† Dr. Andrew, Medical service, ...	1852
Wyatt, G. N., Esq. Indigo planter, Champarun, ...	1848
Wyld, Capt. W., (4th Lancers) Sealcote, ...	1851
Wylie, Macleod, Esq. Barrister, Supreme Court, Calcutta,	1844
Young, G. L., Esq. Indigo planter, Midnapore, ...	1845
Young, Robert, Esq. Berhampore, ...	1850
Young, R. H., Esq. Indigo planter, Surdah, ...	1851

THE JOURNAL

OF THE

Agricultural & Horticultural Society

OF

INDIA.

Correspondence on the subject of supplying India with Cotton Seed from the "Seychelles" Islands.

Extract of Letter from the HONORABLE C. J. BAYLEY,
Colonial Secretary, Mauritius.

To MR. J. JACKSON, *of Mauritius.*

I have always been under the impression that the cotton grown in India has to be renewed by the introduction of fresh seed from the United States every four or five years.

Considering that a much nearer supply might render the planters in India independent of American aid, I applied to the proprietor of one of our smaller Seychelles Islands for samples of cotton, which he gave me, and which I forwarded to Dr. Mouat, who had them examined by some Agricultural or Botanical Society there. The Society reported very favorably upon the sample, and asked for further information.

This information is contained in the letter (which I now enclose for your perusal) received from Mr. Louys, the proprietor, or part proprietor, of one of these islands.

I think you will find its contents interesting; and I should be glad if by any means you could pave the way to the adoption of a plan which I have long cherished—the purchase or hiring of some of these islands by an E. I. Company or body of speculators, for the purpose of producing cotton seeds when required in India. A company of this kind would import their own labour, and would have other facilities which no speculators resident in the Colony could possess.

Yours, &c.,

C. J. Bailey.

To the Hon'ble C. J. Bayley, Esq.,
Colonial Secretary.

Sir,—In reply to the verbal communication with which you favoured me as regards the mutual advantages which would accrue both to the Government of India and to the Seychelles Islands, from a revival of the cotton cultivation at the said islands, I beg to offer the following observations, in order that your praiseworthy object may be carried out, and if you think that my co-operation for such purpose can be of any service to you, I need hardly add that it will be most cheerfully given.

The mercantile community of this colony can do little or nothing for the advancement of your project, neither can the Chamber of Commerce, even with the information it has recently received on the subject of the culture of cotton at the Seychelles, furnish other than the most general observations respecting it; and the inhabitants of the Seychelles can be, even if desirous of giving an active and energetic aid, of little avail, inasmuch as they no longer possess the means of labour, nor have they any one single cotton plantation worthy of notice, both on the Seychelles and Almirante Islands.

Denis, or Sea Cow's Island, is the only one in the Archipelago which still retains cotton plants. I am told there are

in all about 350 acres, but the greater part consists of old plants, uncultivated and indeed abandoned for the last twenty years. The sample of cotton which you forwarded to Calcutta came from these old plants, and the deficiency in the length of the staple, which justly struck the competent judge to whom it was submitted, must have arisen from the entire want of culture, and the length of time the plants had been allowed to run wild.

The old and experienced planters of Seychelles, whom I have consulted on the subject, all concur in the opinion, that the staple of the cotton-wool of Denis Island was much longer when the plant was duly cultivated than it now is after years of neglect. Indeed, it will be scarcely necessary for me to dwell on the wide difference that is invariably found to exist between careful culture of almost every plant, and the partial or complete neglect of it.

All the Seychelles and Almirante Islands are more or less fit for the growth of cotton. This plant thrives best in a marine atmosphere, and when grown in a low and sandy soil yields a silky fibre of superior quality. The flat and sandy islands of these archipelagoes possess this double advantage, their physical formation is most favorable, and their coasts yield an abundant supply of sea-weed, which constitutes a most valuable manure, but I am assured that the uplands (as they may be termed) of these islands are not so well adapted to the production of good cotton as the parts more immediately adjacent to the sea, and that, as observed in America, a wide difference must exist at the Seychelles between the quality raised there and on the uplands.

There is reason to believe that the great similarity, both in geographical situation and nature of soil, which exists between the sea islands of America and the flat islands of the Seychelles, would lead to a corresponding similarity in the quality of the cotton of the two countries, provided the same care were given to its culture. Indeed, if the traditionary

recollection of the oldest inhabitants of Bourbon is to be relied on, the seed that was imported into both the sea islands and the Seychelles, originally came from Bourbon. A strong probability of the correctness of this tradition may be found in the fact, that the French, when in possession of the Bahamas imported cotton seed from Bourbon. It is therefore likely that the acknowledged superiority of the cotton there and then raised, as compared with the indigenous cotton of America, may have led to the introduction and cultivation of a similar kind both in the sea islands and throughout Georgia.

That it is the interest of the Government of India there should be a nursery close to that great Empire, under the control and protection of the E. I. Company, capable of supplying a sufficient quantity of cotton-seed to renew the plantations of India, as often as might be deemed expedient, will scarcely admit of a doubt. To be independent of the American States for such supply is alone a consideration of much importance, but I would moreover add, that in return for the benefit of Indian immigration to this Colony, (a measure as advantageous to the Indians themselves as to this Colony in general,) it would only be a just return that a plan emanating from the Mauritius should prove to be of use to that country which has rendered such services to this island.

As already stated, a low and sandy soil, constantly exposed to the influence of the sea-breeze, being more especially favorable to the production of the superior qualities of cotton, three-fourths of the area of the different islands of the Seychelles are for this reason laid aside. The remaining fourth is so sub-divided among numerous small proprietors, that it would be next to impossible to introduce among them such an organised system as could alone offer the least chance of success in any scheme of cultivation that might be proposed; and another objection would also be found in the

distance of one island from another (in some cases sixty miles) which would alone be an insuperable obstacle to the self-supporting plan, should such a plan be deemed deserving of a trial.

But in order that my plan, the one I have now the honor to submit, should at least convey a correct idea of its probable success, I will put the following questions :—

1. What quantity of cotton seed is annually imported from the United States of America into the territories of the East India Company ?

2. What is the cost of these seeds delivered in India ?

3. How many acres of land are annually under cotton culture in these territories ?

4. How often do the plants require to be renewed ?

These questions will probably find no answer in this Colony, they must be referred to India, but let the answers be what they may, I apprehend there is no doubt that the Seychelles can alone furnish more seed than will be required for the cultivation of whatever quantity of land may be applied to such purpose in the E. I. Co.'s territories. The following statement is offered in corroboration of the assertion :

An acre of land planted in cotton at the Seychelles will give two crops per annum. It yields on an average of each acre 1000lb of cotton and seed together. When these 1000lb are cleaned, there will remain 250lb of cotton and 700lb of seed, the remaining 50lb going to waste. Each pound weight of seed, will contain about 6,500 seeds ; now as each acre is so planted as to contain from 1,000 to 1,600 plants, with two or three seeds to each hole, it will require (taking 1,600 plants to the acre) only one cwt. of seed to plant 950 acres of land.

Say 700lb + 6,500 seeds 4,550,000

1,600 plantg. + 3 seeds 4,800 seeds + 950 acres 4,562,000

Estimating therefore the extent of land under cotton culture in the E. I. Co.'s territories at 200,000 acres, it would only require 210 acres of cotton plants at the Seychelles to

furnish the supply required for India. This is on the supposition that the plants would be required to be renewed every year, which we know not to be the case, fresh seed being required only every third year.

acres		seeds required per acre,		seeds.
200,000	+	4,800	.. .	960,000,000
	seeds	seeds	acres	
700lb	+ 6,500=4,550,000	+ 210	..	955,500,000

An experiment on a small scale was some years since made in Guzerat with seed imported from Bourbon. It was not successful, owing mainly to the ignorance and prejudices of the natives; but the Committee appointed at Bombay in 1822 to report on the merits of the produce of this seed, stated that:

"Having examined two parcels of cotton raised from Bourbon seed, we find it of a good staple and silky wool. The quality of this cotton is well calculated for the Europe market. Such a favourable result surely warrants the expectation of great success in future trials."

I am not aware that any similar trial has since taken place, but it strikes me that it would be desirable and most interesting that a further one should be entered on as early as possible, and in order that I may close this long letter by a practical suggestion, and one as it appears to me most easy of execution, I make the following proposal:

Denis Island belongs to me: it is of all the Seychelles group the island that has always produced the finest quality of cotton. The extent of it, adapted to this culture, is about 400 acres, consequently amply sufficient to supply seed for all India. It is isolated in its situation, being sixty miles north of any other island, relieved therefore from the inconvenience of neighbourhood. Its latitude 3° 50 m. S.

I propose then—

1*st*. To abandon whatever cotton there may be on this island, in order that it may be sent to India on trial.

Whatever it may realize will go to defray the small expense attending such trial. A few prisoners taken from the Seychelles would gather the cotton in a few days, and the freight to India from Mauritius, in the return cooly vessels, would be trifling or probably nothing at all. The cotton itself might not be good, but the seed would be valuable; and experienced judges could form a fair estimate of the change that would be made in its quality by careful cultivation.

2nd. In order that a more complete trial may be made of the value of this island as a nursery of seed for India, I further propose that the East India Company or any Agricultural Society from either of the Presidencies should send there an intelligent overseer and some labourers, they could then gather the cotton now on the plants, clean and pack it, they could also uproot all the old plants, and replant the whole of the island. I, on my part, would willingly make over not only the cotton now growing there, but also the two ensuing crops from the new plantations. During the time this island would be under this new system, it would be gratuitously granted by me "ensouissance," and the only stipulations I would make would be that of not destroying the few cocoanut trees that now exist upon it.

Should the foregoing experiment be found to be of a satisfactory nature, I should feel induced, subject to an agreement involving no expense whatever to the Mauritius Government, or even to that of India, to concede my property rights to this island to the Government of India.

With every apology for trespassing so much on your time, and with an offer of any additional information should you deem it necessary.

PORT LOUIS:
24th June, 1853.

I have the honor, &c.,
C. AUGUSTE LOUYS.

Official Papers on the Basts of Arracan. Communicated by the Government of Bengal.

OUR GOVERNOR OF THE PRESIDENCY OF FORT WILLIAM IN BENGAL.

We transmit herewith for your information, and for communication to the public in such manner as you may deem expedient, copy of a report which has been submitted to us by Dr. Forbes Royle, on the subject of the "Bast" produced in the Province of Arracan, showing the uses to which that article is applied in this country, and the prices usually obtained for it when imported from Russia. A sample of the Russian Bast Mats is also transmitted.

We are, &c.,

(Signed) J. OLIPHANT,
AND
13 OTHER DIRECTORS.

LONDON:
15*th February*, 1854.

SIR JAMES MELVILL, K. C. B.
Secretary to the Court of Directors of the East India Company.

SIR,—Having been of late much engaged in examining and showing to practical men the various fibres which were sent to the Great Exhibition of 1851, as well as those which have recently arrived from Assam, I was induced to turn my attention to the subject of Bast. Of this large quantities are imported into this country in the form of mats from Russia, chiefly for the use of gardeners, who use them for covering pits and frames, or protecting plants; and afterwards when pulled to pieces, for tying up plants and vegetables. The mats are also extensively used for packing cabinet work and furniture in general.

The subject may appear trifling, but it is calculated that about three and a half millions of mats are exported from Russia, and about 8 to 12,00,000, are annually imported into this country. They are made of the bark of the lime or linden tree, which, when stripped off, is also made into shoes, cordage, sacks for corn, &c. The linden tree is not found in India, but there are many which belong to the same family of plants found there, some of which probably yield similar products, possibly one or two of those to which I now wish to draw attention.

Among the raw products sent from the Province of Arracan, there were six kinds of Bast (which there seems to be called *Shaw*) with specimens of rope made with them. They were named : 1, Thing-lean-shaw ; 2 Patha-you-shaw, 3 Shaw-phyoo ; 4, Ngan-tsoung-shaw; 5, Shaw-nee ; 6, Eee-gyot-shaw. Observing that some of these, from their strength, flexibility and softness, were well calculated to answer the purposes of the Bast in ordinary use, I sent some specimens to Dr. Lindley, and requested him to have their useful properties ascertained in the Horticultural Society's garden at Chiswick, as he informed me that both the Superintendents, Messrs. Thompson and Gordon, reported very favorably of them. I requested the latter to give me a detailed report, including all such information as would be useful to merchants in Arracan. The kinds sent to him were, No. 2, Patha-you shaw, 3, Shaw-phyoo, and, one marked Sanseviera-zeylanica, perhaps No. 4 or No. 6.

Though well aware that the freight must always operate against a bulky article of low price brought from so great a distance, yet there are occasions when from a stoppage of, or a deficient supply from ordinary sources, a rise of price ensues, which might be taken advantage of at a place on the coast like Akyab. I would therefore beg to suggest that the accompanying report should be sent to India for the information of the merchants in Arracan, or for publication in

the Journals in India. At all events a knowledge of the good qualities of these Indian Basts might lead to their employment in India, and to their export to less distant countries than England. As it is possible that merchants in Arracan might wish to make mats in imitation of the Russian, I would suggest that a piece of one of these might be sent there, as by this the thickness of the transverse, and the pliability of the longitudinal pieces of the Bast, of which they are composed, might easily be imitated.

EAST INDIA HOUSE: I have &c.,
16*th Jany.*, 1854. (Signed) J. FORBES ROYLE, M.D.

Report upon a new kind of Bast Matting from India.

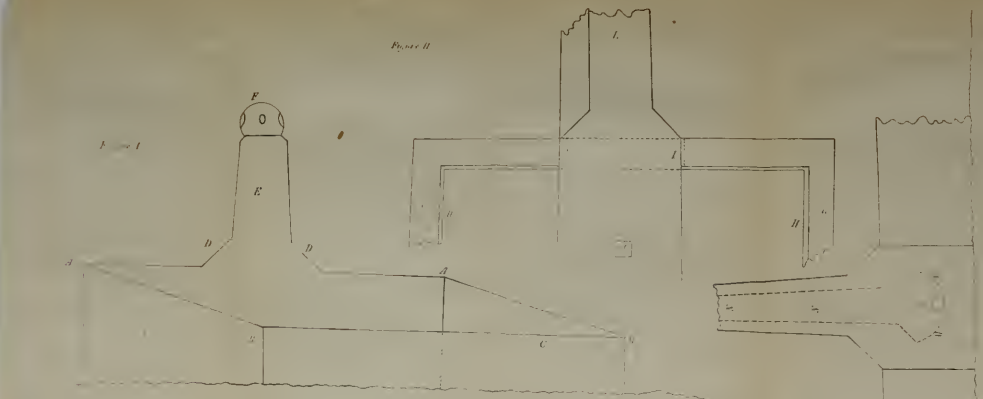
HORTICULTURAL SOCIETY'S GARDENS, CHISWICK.

11*th January*, 1854.

SIR,—The three pieces of Indian Bast sent appear all the same, at least I cannot detect any difference in their qualities or appearance, and I think, when it is made into mats, will prove an excellent substitute for Russian mats. It is very strong, is in broad strands, very pliable and tough when wetted, easily divided into small portions for the purpose of tying, &c., and is entirely free from knotty places, and when worked into mats in the Russian way, will be an excellent winter covering for pits and frames; the material also seems more firm and tough, and I have no doubt will last at least twice as long (in wear) as the best Russian mats, and if sold at a less price will in time supersede them.

The price of Russian mats is now from £ 7-10 to £ 8 per 100 wholesale, and from 2*s.* to 2*s.* 6*d.* each, retail.

A full-sized Russian mat weighs about 5 lbs., when new and quite dry, is 7 feet long and 4 feet broad, and is made with the rougher and worst strands worked crossways, and the thinner and longer strands longways in the mats.



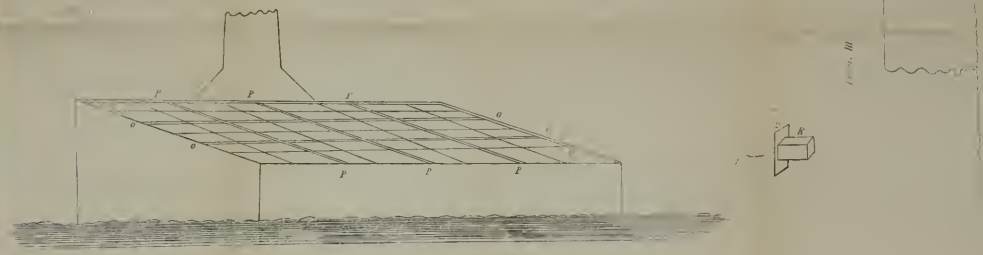
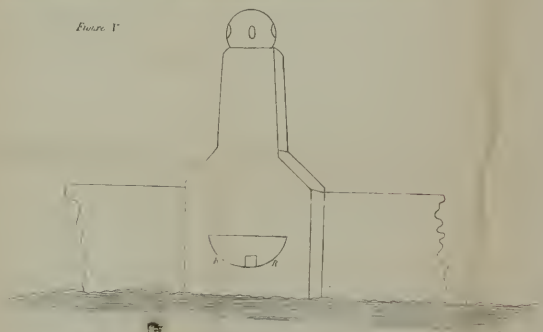
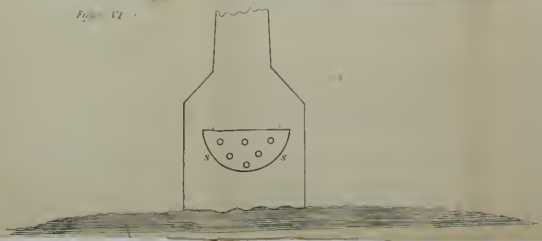


Figure V.





In making mats it should be observed, never to have any of them under the regular size, for small mats (either shorter or narrower) greatly detract from the value of full-sized ones, when mixed with them.

I remain, &c.

(Signed) GEORGE GORDON.

To DR. ROYLE,

&c., &c., &c.

One of these was marked Patha-you-shaw, another Shaw-phyoo, and a third was marked Sanseviera-zeylanica on the surface of the Bast, but the native name was lost.

(True Copies)

W. G. YOUNG,

Under-Secretary to the Government of Bengal.

Suggestions for a "Plant House." By Lieut. W. H. LOWTHER, 52*nd Regt. N. I.*

I beg to offer a few hints for the construction of a very cheap and effective "Plant House," which my experience suggests will be acceptable to most of your floricultural readers; perhaps, I may also add, to the Society itself. A residence of some years in the Punjab, and N. W. Provinces, enables me to speak feelingly of the disappointments and disasters which befall the gardener, the natural results of extreme temperature, more especially that of "cold," and I am given to understand that even in the milder winters of Bengal, such is too often the lot of the cultivator.

I therefore propose to alleviate, in a great measure, one obstacle to the success of horticulture, for the discovery of which plan, I must state, that I am deeply indebted to two excellent English works on gardening, viz. "The Cottage

Gardener," and "Annals of Horticulture;" the former contains economical details for constructing a "frame" suited to the means of the poorer classes for raising early cucumbers, &c., &c.; and the latter in its universal tendency to promote the love of flower-growing among the community, proposes that every body may have his greenhouse, by making an aperture in the back of a fire-place, and thereby admitting warm air to his collection of plants, (contained in some shed, or closet adjoining.) By combining the advantages of both methods, I think I have succeeded in establishing a greater facility of culture, than hitherto attained in the cold season, one also within the reach of the humblest votary of Flora.

I shall now proceed to describe the accompanying diagrams, executed to facilitate the workman's task.

Figure I,—exhibits an outer view of the requisite elevation on a scale of half an inch to one foot: thus the wall AA will be 12 feet long (*inside* measurement) and 4 feet high: BB will be likewise 12 feet in length, but only 2 feet in height,—thus giving an incline to the side walls CC, the inner space between these two parallel walls will therefore be about 6 feet. The angles DD support the base of the chimney shaft E, near its junction with the wall AA: a weather "cowl" FF is formed of a common water "*ghurrah,*" having three apertures,—front,—right,—and left, to allow the egress of smoke, and prevent the wind from driving it back again into the flue.

Figure II,—shews the construction of the surrounding walls and chimney: the former GG may be built kutcha, or pucka at pleasure, and should not therefore be less than one foot thick, leaving a rim, or ledge of a few inches broad to receive the wood-works of the frame. II is a moveable board or plank of painted wood, fitting exactly, and shifting so as to enable access to the plug-hole J, for insertion or withdrawal of its stopper K. This should be made of hard wood, and have a handle and tin backplate: (as in the

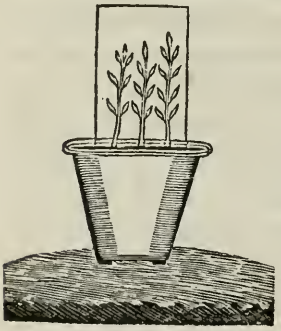
sketch) the one to facilitate removal,—the other to seal the aperture thoroughly, when required. The plug-hole J should not exceed six inches,—every way. L the shaft must be *two feet* square (outside) near its base of junction with the angles DD., and tapering *slightly* in its ascent: the height of mine from the ground level is exactly 8 feet, (but this will vary with circumstances).

Figure III,—will give a notion of the fire-place I employ. Of course, I merely burn logs and rough billets: observe that the "plug hole" rests on the bottom of it, for the very particular reason that being always covered with hot embers, no smoke can possibly find entrance into the adjoining frame-house, (which would not be the case, if this precaution were only slightly neglected). To promote this object more fully, the chamber of the fuel receiver MM is built concave. The flue NN is exactly one foot square in the narrowest portion of its dimensions, (or at its union with the "cowl.")

Figure IV,—explains the necessary wood-work: there should be two stout timbers let into the walls, AA and BB, at about four feet apart, to receive the superincumbent weight of the frame, which ought to be constructed thus: QQ is the outer part (which will eventually rest on the ledge HH) the two main spars OO will be crossed by three minor laths PPP, the whole being secured with light iron screws. Between the spaces of these bars, (if glass be deemed inconvenient, or too costly,) tightly attach stout packthread lines, fastening them to small nails: then stretch over the entire frame, a good strong piece of calico, or sheeting, which you must fix with tin tacks, afterwards applying two coats of drying oil with a brush; this operation will render the cloth transparent and waterproof,—both very necessary qualities. I have always used newspapers, oiled as above, but cannot recommend it, as being constantly damaged by wind, hail, and feline interlopers.

For hinges I always employ loops of string, or leather, fastened to the frame-work, and carried over the back wall to iron hooks, but these "ties" are often demolished by white ants. When you require to open the "lid," (*i. e.* lift up the frame,) the best plan will be found in two notched bars, which turn on a nail, and support the two corners of the elevated portion,—fitting into grooves made for their reception.

Figure V,—is meant to show that side of the stove, which is next to the tent or room required to be heated, and which is supposed to be occupied by the individual who superintends the culture of the plants in the "frame-house." RR represents the required size, and shape of the fire-place, viz., almost a semi-circle. It is necessary to cover this front at times with a fire-guard, both to prevent accidents from falling embers, and prevent unnecessary draughts of air. I find the simple screen in the annexed (figure VI,) drawing quite sufficient for this two-fold object. Let it be of zinc, or tin perforated with a few holes, and at least 2 inches larger every way than the hearth it covers. From November till March, this little building will be found invaluable to the geranium grower, or propagator of the choicer tropical plants: it will also be considered a *sine quâ non* in the culture of cuttings, which in this temperate nursery will have become *vigorous* trees ere the trying hot months of the year commence.



In the centre of the house I made a small hot-bed, in which were immersed "thimble pots," each holding two or three cuttings or a few seeds, and each was covered with a cut bottle (of clear glass) thus: I select the strongest blueish green coloured, and divide them by wrapping round the part to be cut a

thread dipped in spirits of turpentine, which is then set on fire, and a drop of cold water allowed to fall on the heated part. I once warmed a frame of this kind by horsedung only, but I found the heat very unmanageable and cannot recommend it. In the present plan we can graduate the temperature to any point we please, and I suggest that a thermometer, with an index, visible from the exterior, be suspended, to assist in preserving a proper medium. I found 70° to 80° the usual standard about midnight, after which as the embers were allowed to expire, it fell some 10° or 12° but only very slowly. For the growth of tender orchids and some other plants requiring moist heat, I use steam, in the following easy manner. A common tea-kettle should have a tin tube attached tightly to the spout, (which would pass through the plug-hole into the plant house;) when the water contained in the kettle boiled, a continuous jet of warm vapour would be sent forth, closely resembling those hot fogs of the forests from whence these beautiful ornaments of nature are brought. Perhaps also this kind of frame may prove of use to the breeder of poultry, and such a one could be attached to every farm-yard at a very low cost: it might be made a very profitable source of amusement.

On a future occasion I shall give you a paper on "Greenhouses in India" as useful and ornamental buildings; showing their construction on a larger scale, suitable as appendages to the mansions of the rich and botanical establishments.

Communication on the cultivation and manufacture of Flax, in Great Britain and Ireland; with remarks on other Fibres, and on Oils, Tallow, Cotton, &c.; addressed to the Special Committee of the Agricultural and Horticultural Society: by the Secretary.

Referring to my letter of the 25th of August last, I avail myself of the leisure which a sea voyage affords, to submit, for your

information, and that of the Society, in separate memoranda, (Nos. 1 and 2,) the result of my enquiries on some of the subjects alluded to in your communication to my address of the 29th June, 1854.

The first subject I have noted down, as perhaps the most important, and consequently, that to which I have devoted most attention, is the cultivation of Flax, and its after preparation under certain recent improved processes. I stated in my former letter from Scotland, that the Committee's letter of the 29th June having reached too late to admit of my obtaining, previous to my departure from London, any particulars as to the best localities for procuring information on these points, I had addressed the Secretary of the Society of Arts, and Dr. Royle, on the subject. Owing, however, to the absence of both of these gentlemen in the country, for the summer vacation, the desired information was not received, and I was thrown entirely on my own resources. I lost no time, however, after receipt of your letter, in visiting Dundee, the great emporium of the flax trade of Scotland, (and of jute also, of which it takes from fifteen to sixteen thousand tons annually,) and placing myself in communication with the Chairman and Secretary (Messrs. Thomas Bell and Robert Sturrock) of the Chamber of Commerce of that city. I received every assistance from both gentlemen in the prosecution of my enquiries, and obtained from them letters of introduction to the Chambers of Commerce at Glasgow and Belfast, and to the manager of the Redford flax factory at Thornton near Kirkaldy. I have also to express my acknowledgments to Mr. Robert Buist, of Dundee, (who is largely interested in the flax trade,) for his attention, and for furnishing me with sundry packages, from his factory, of the raw material, as test samples for the Society's Museum. I may here remark that I saw large quantities of Riga flax being worked up at the mills in Dundee, not superior in quality to what has been, on several occasions, submitted to our Society as the growth of Bengal and Behar. Mr. Sturrock informed me in conversation, and afterwards by letter, that a larger quantity of flax of *a second-rate quality* is consumed at the various mills at Dundee and its vicinity, than perhaps in any other part of the United Kingdom. He suggested the propriety of a small quantity, say a ton, of Indian-grown flax-straw, packed as jute, being forwarded to his

Chamber, with the view of having it prepared after Schenck's process, a process which admits of the straw being kept for months before the removal of the fibre, and promised to communicate the result of the experiment, in due course, for the information of our Society, and to furnish specimens of the prepared fibre. This would not, of course, answer as a commercial speculation, but the offer appeared to me so desirable and feasible, with the view of testing whether the Indian plant, *as now grown*, can be converted into a serviceable article, that I readily intimated my intention of bringing it to notice; and which has been already done in my letter of the 24th October, to the address of Mr. Robinson, the Acting-Secretary. I refer again, in this place, to Mr. Sturrock's offer, in case the subject has been overlooked in the many other matters which are being constantly brought before the Society.

From Dundee I paid a visit to the Redford flax works, where, I was informed by Mr. Sturrock, I should see the late Mr. Schenck's patent hot-water system of retting, and Wilson's patent scutching machine in full operation. Mr. Wilson, the general superintendent of that and certain other flax works in Fifeshire, was absent on the occasion of my visit; but I was very politely received by Mr. Henry Jackson, the manager, who not only shewed me over the works, but explained the whole process. I had not an opportunity of seeing the plant on the field, it having been pulled and stacked ready for use sometime previous to my visit; but I obtained all the available information respecting the mode of growth, the most favorable kinds of soil, manures employed, &c., &c., from Mr. Jackson: these I have also embodied in the annexed memorandum.

My next visit was to Glasgow. In conversation with the Secretary of the Chamber of Commerce, I ascertained that Messrs. John Leadbetter and Co. of that city were the agents for the patentees of Watts's patent process of preparing flax, both in Scotland and Ireland. I had determined, in the first instance, on visiting Belfast, but the weather during my stay at Glasgow was so very unfavorable, that I was strongly recommended to delay crossing the Channel till it cleared up: but the brief period before me not admitting of this, I gladly availed myself of Messrs. Leadbetter's offer of an inspection of one of their factories, at a place called Wishaw, about 18 miles from

Glasgow; and thither I proceeded on the following day. Owing to the absence of Mr. Deans, the manager of the works, the process was not explained to me so fully as on the occasion of my visit to Redford. I am therefore chiefly indebted to notes made at the time, as also to particulars obtained afterwards, for the information detailed in my memorandum. I may here add that Messrs. Leadbetter intimated their readiness to institute experiments, after Watt's process, on a quantity of Indian-grown flax-straw. This offer has also been communicated in my letter to Mr. Robinson above adverted to.

But though unable, for the reasons already assigned, to visit Belfast, I have been in correspondence with the Secretary of the Royal Society for the promotion and improvement of the growth of flax in Ireland, and with Messrs. A. Bernard and Koch, of Cregagh Flax works, Belfast, the proprietors of Schenck's patent system. The result of this correspondence will be found in my memorandum.

From Glasgow I went to Leeds, viâ Manchester, where I had an opportunity of inspecting the works of Messrs. Peter Fairbairn & Co., but I did not, as I had been led to anticipate, see any scutching or hackling machines in their establishment, as they do not profess to make these, but machinery of a more complicated and costly kind for spinning and weaving purposes, &c.; nor did I observe, in any other part of Leeds, scutching or hackling machinery, which, in my opinion, would be suitable, at the present time, for India. Messrs. Fairbairn politely offered to afford any assistance in their power in forwarding the Society's views. They expressed their opinion that the scutching machine manufactured by Messrs. McAdam, Brothers, of Belfast, (McBride's invention is, I believe, the one alluded to,) would be better adapted for India than the more complicated kinds of Wilson and Watts. While at Manchester I was enabled, by the kindness of Messrs. William Fairbairn and Sons, Civil Engineers, to look through their establishment. The inspection was a very interesting one, but I did not observe any machinery connected with the object I had in view.

On my return to London, I was in communication with several gentlemen interested in flax manufacture. To Mr. John Clough, of Blackheath, (formerly of the firm of Atkinson and Clough, engaged in the flax trade at Leeds) and to his brother, Mr. Thomas Clough, of

Howden in Yorkshire, I am more especially indebted for much useful information on the subject. In accordance with my request, the latter gentleman has been kind enough to have a set of implements manufactured for me, such as are at present in use in that county, for the preparation of flax. These, I was fortunate enough to receive the day previous to my departure from England, and I have brought them with me. They will, I believe, prove an useful addition to the Society's stock of implements.* These gentlemen have further offered their assistance, in any way that it can be rendered, towards meeting the Society's views. For further particulars on this head I must beg reference to my memorandum.

The memorandum, No. 2, refers to China grass, plantain fibre, oils, and tallow, and other subjects of which I have treated in detail.

In conclusion, allow me to observe that, though the brief period of my residence in England, coupled with my impaired state of health, have prevented my obtaining so much information on various subjects as I could have desired, I trust the Society will give me credit for having used my best exertions to advance the objects they have in view, as embraced in the papers herewith submitted.

SHIP *Bengal* AT SEA, *November*, 1854.

A. H. BLECHYNDEN, *Secy. A. & H. S.*

P.S.—I have to apologize for the "getting up" of this letter and its accompaniments. They have been written at various times and under difficulties which can be best understood by those who have had any experience of the discomforts of a long sea voyage.

* The cost to the Society will be £2-13, in all, viz. :—

For a set of implements, including 120 hackle teeth for three more hackles, ...	£1 16
Case for the above, and carriage from Yorkshire to London, ..	0 17
	£2 13

N- B.—No charge for freight from London to India, as I have included it among my luggage.

No. 1.

Memorandum on the cultivation of Flax in Great Britain and Ireland, and its after preparation under certain recent improved processes; and also according to the old system.

Notes of a visit to Redford Flax factory, at Thornton, Kirkaldy, Fifeshire.

The proper management of the Flax crop in Fifeshire.

Soil.—The soil which is considered as best suited for flax is a sound dry deep loam, with a clay subsoil. It is of the greatest importance that it should be clean, and in good condition, for the flax crop does not differ from any other crops in this respect, that, to be grown profitably, the land should be manured and well farmed. It is also very desirable that it should be well drained, for when it is saturated with either under-ground or surface water, the flax grows rank and soft, and very liable to lodge. Light, sandy, gravelly, or mossy soils, are not likely to produce a remunerative crop.

Rotation.—The best rotation is probably after oats, which has followed a green crop or old lea (meadow land, or after grass,) but flax should never be grown after 2 or 3 succeeding crops of oats. Very fine crops will probably be obtained directly after old lea and wheat.

Manure.—A certain quantity of suitable manure should invariably be given : say, town refuse, or street manure, at the rate of about 12 tons per acre ; if that be not obtainable, the shortest of the ordinary farm manure will answer nearly as well. Rape-dust, to the extent of 3 cwt. per acre has also been used with great advantage, if a shower of rain intervenes between the sowing of it and the flax seed. Guano is not recommended, as it has been found to give but a poor quality of fibre, and to render the straw soft and liable to lodge. A short active manure tends to produce an equal braird, and to hasten the growth of the young plant, so that the weeds may be choked, and the land sheltered ; after which, there is, generally speaking, little doubt about the crop.

Preparation of the soil.—Thorough draining is a point of the greatest importance. The land should be so well drained, that it can be sown in flats, which will give more even and much better crops. It should also be carefully and repeatedly cleaned, and the surface mould reduced to as fine a state as possible ; but there is some danger in loosening the subsoil too much, for the flax plant has but a small root in comparison with the length and weight of the stalk ; and, in order to keep it erect, the land should be moderately firm.

Ploughing is commenced early in autumn, and the land thrown into ridges to receive the frost and air. If the ordinary fárm manure is used, it is ploughed in at this time. In spring, a light ploughing is sufficient, so as to preserve the winter surface for the roots of the flax—and the street manure is laid on at this time. This is done in March, about a month before sowing, so as to allow any seeds of weeds to vegetate, and harrowing, before sowing, will kill them.

Sowing.—Previous to sowing, a clod crusher or roller may be advantageously used, to give an even surface and consolidate the land, and this broken up again with a short toothed or seed harrow. Then sow, and cover the seed with the same harrow to the depth of an inch, and finish with a heavy roller. Riga seed has been found best adapted to the generality of soils, but should never be sown without being previously sifted through a sieve, to clear it of all the seeds of weeds. Home saved seed, one year from Riga, when changed to a different locality, produces equally good crops. The proportion of clean seed may be stated at 3 bushels to the Scotch acre, and should be sown broad cast; the sowing of clover or grass seeds, along with the flax, is objectionable, as these plants always injure the root ends of the flax.

Weeding.—If care has been paid to cleaning the seed and the soil, few weeds will appear, but if there be any, they must be carefully pulled. Care should also be taken to walk lightly over the young plants, and the weeders should walk facing the wind, so that the plants laid flat by pressure may be blown up again, or thus be assisted to regain their upright position. The tender plant, pressed one way, soon recovers ; but if twisted or flattened by careless weeders, it seldom rises again.

Pulling.—If the weather continues to be fine, the crop should be well ripened before being pulled. It should not be commenced upon until the seed is getting brown, and the leaves are falling off the stalk; for if well ripened one foot, the time required to win it in the stook, and consequently the risk of damaging it, are much lessened. Too much care cannot be taken in keeping the root ends of the sheaf perfectly square like a brush, which can only be attained by keeping the left knee well forward, and pulling the plant perpendicularly. The best size of sheaf is about six inches diameter, and as small a quantity of flax should be used for the band as possible; three stalks are sufficient. "Bands of straw and rushes and hemp string are also employed for tying the sheaves, but the flax bands are most easily obtained, and sustain little damage in the usage. It is also customary to set up the flax in "wind rows," and afterwards in narrow "wind stacks," before storing or stacking it in bulk, but the ordinary plan adopted with grain crops perfectly answers the purpose, and takes less time and trouble than the above. Two binders and ten pullers should pull and stook an acre in 10 hours."

All the flax manufactured at Redford factory is raised by farmers in the neighbourhood, with whom the proprietors contract at a certain rate, (about £ 4 per ton.) Upwards of 2,000 acres were sown with flax in the county of Fife in 1854, the largest breadth yet known, and it will probably increase next year, as political events are likely to restrict the extent of supplies from abroad. As much as £16-10 per acre have been realized this year, or about £9 profit, after paying all expences: a good crop of wheat may fetch £12 per acre.

The new system of steeping has, among others, this one great advantage over the mode usually adopted in former times, viz., "that it is no longer expedient to strip off the seed from the plant "in its green state; nor is there any inducement, in order to "improve the quality of the seed, to allow the plant to grow beyond "the time when it is fit for pulling—thus at once unnecessarily im- "poverishing the soil, and deteriorating the quality of the fibre. "On the contrary, the plant may now be pulled solely with refer- "ence to its perfection of fibre, while, after it has been removed

"from the soil, the seed still continues to draw nutriment from the "stalk, and fills and swells, and ripens in the stook."*

Nor is it necessary to separate the seed from the straw, nor the fibre either, immediately after pulling. These processes can be accomplished at the pleasure of the proprietor, the straw being in the meantime stacked with care. Having been previously stooked, the stacking can be commenced on, so soon as the sheaves are entirely free from damp inside and out, and the seed has become brown and dry. "Logs of wood, and thorns, and brambles, should be placed at the bottom, and the stack erected in an oblong square, in such a direction as to catch the prevailing wind on the narrow side of the parallelogram, the roots being laid at the outsides, and each quality of flax, if more than one, carefully distinguished. The stack must be thatched, and examined daily, to insure the discovery of heat, if the flax should "come" again. If heat occur, either in stook or stack, they must be taken down, and the sheaves spread out, otherwise the fibre will be irreparably injured. With ordinary care, however, and without extraordinary bad weather, this cannot happen, and in ten days the crop may be considered out of danger."†

Thus much for the cultivation of the plant. I now proceed to the preparation of the seed and fibre. The machine I first inspected is employed for *separating the seed from the straw;* it is on the principle of the rippling comb, but more complicated and on a much larger scale. I regret to find that I have lost my notes respecting this machine, and my knowledge of machinery is too imperfect to enable me to give a description from memory. It performs much more work in a given period than the ordinary rippling comb, which, I believe, will not ripple more than 16 to 18 cwt. of straw in 12 hours, whereas the machinery above referred to is capable of rippling and seeding 8 tons of straw in the same time.

* Transactions of the Highland and Agricultural Society of Scotland, No. 37, for July 1852, p. 314.

† *Ibid.* pp. 318, 319.

The chaff obtained from the seed bolls is sold at from 2*d.* to 4*d.* per bushel. The refuse straw ("shove," or woody centre,) is used for feeding the boiler fires.

The steeping vats, (which is the next operation) are each capable of holding 6 tons of seeded straw, 600 cubic feet of vat room, as a rule, to one ton of straw. The average quantity of water per ton is about 2,500 gallons. These vats are heated by a modification of Schenck's hot-water apparatus. The straw requires to be steeped for seventy hours.

After it is taken from the vats, the straw is passed through a series of heavy-metalled rollers, which completely removes the bark or epidermis. The first roller process with cold water, the three after processes heated by *steam.* One of these series or sets of wet rollers is capable of doing three tons per day of seeded straw.

If the weather be fair, the straw is then dried in the open air: if unfavorable, in a place built expressly for the purpose, where it is dried by hot air. It is then ready for being scutched: but it can be stacked for any length of time, and is generally improved by being retained for some time.

The *Scutching Machine.*—I annex a sketch of Wilson's patent scutching machine, which is the kind in use at the Redford Flax Works. The interior of the machine consists of a cast-iron drum, with iron beaters, which works against the horizontal resisting plate. The weight of each machine is 8 cwt; it turns out about 60lbs of fibre per diem.‡ The cost of the machine itself is £15

and five holders and key, 1 10

or complete, £16 10

I was unable to obtain the price of the other machines in use in this factory.

The tow, or codilla, I am informed, fetches about £7 per ton.

I should add that the effluvia arising from these steeping vats, is exceedingly unpleasant; and, in this respect, this modification of Schenck's is no improvement on the old plan of cold water retting.

‡ The proportion of fibre and straw is one to ten: that is to say, about two cwt of fibre is obtained from a ton of straw.

I may as well introduce in this place a list of the specimens received from Mr. Jackson, viz :—

No. 1. A specimen of flax straw raised in the vicinity of Redford factory from Riga seed.

This is the kind of straw most suitable for the purpose of the manufacturers, viz., long and moderately fine, and of a clear yellow colour, and these conditions, they observe, can only be obtained by good farming and great attention. Clay land gives the colour, and manure the length and quality. By the application of the latter, the farmer is said to derive three decided advantages: *Length*, and consequently a greater weight per acre. *Quality*, and consequently a higher price: and the land remains in a much better condition for the succeeding crop.

No. 2. A specimen of flax raised in the same locality, and prepared in the same factory, by Schenck's patent. Flax of this quality is valued, at the present time, at from £70 @ £75 per ton.

No. 3. A specimen of seed raised in ditto from Riga stock.

Notes of a Visit to Wishaw Flax Works, in the Vicinity of Glasgow.

Watt's patent process of preparing flax is in operation at the rettery at Wishaw. Steam is the only agent employed. The process is, comparatively, simple and effective. Indeed, the whole arrangements are, for the quantity of work performed, inexpensive, and occupy but little space. The rettery at Wishaw is smaller than another belonging to the same parties at Croy, (which I did not visit as they were not then working,) but the arrangements can produce from 125 to 150 tons of cleaned fibre, about 50 tons of tow, 6,000 bushels of seed, and 150 tons of chaff, requiring about 1,200 tons of flax straw for a year's consumption. The machinery, including engine, boiler, gearing, &c., would cost about two thousand pounds.

By this process, and by the improved machinery employed, the fibre of flax can be prepared for the spinner, from the period at which it leaves the hands of the agriculturist, in less than

two days. The several processes which the plant had heretofore been required to undergo by the old system, occupied nearly a month. "If is obvious therefore,"—observes a writer on this subject—"that if time be an object in manufacturing processes, and that if the saving of time be synonymous with the saving of money—the material suffering no injury by the acceleration of the method of treatment,—the saving which accrues in the cost of manufacture, and ultimately in the price of the manufactured product, must be proportionate to the increased speed of the process."

The following notes on the process are principally taken from a little paper handed to me by Messrs. Leadbetter and Co., and I can vouch for the correctness of it from personal inspection :—

The straw having been conveyed from the stacks to the large store room, is taken from thence to be rolled. This rolling is performed by two pairs of iron rollers of about 10 inches in diameter, and 18 or 20 inches in length, for the purpose of breaking the seed pods. Having been rolled in small handsfull, it is thrown on one side to another worker standing before a wheel of about 3 feet in diameter, and with about an equal breadth of periphery, armed at the ends of the radii with broad pieces of wood, not unlike the floats of a steamer's paddle. These boards strike upon the ends of the flax, and effectually remove the seeds and husks, which, after passing though a large riddle, and under a smaller roller, to be more completely broken, are then, by an endless chain of buckets, carried up to a hopper, which throws the seeds and chaff into a pair of fanners, very similar to those which in corn mills separate the chaff from the wheat ;—the husks go out in one direction, and the seeds in another.

The flax straw having been thus deprived of its seed pods, is put into square boxes, in small bundles, which boxes, being moved up and down by the constant and rapid action of short cranks and shafts, are shaken until the roots of the straws are brought to the bottom of the boxes. These bundles are then put into frames, where, by means of a strong iron compress, wrought by hand, they are brought to as small a compass as possible, and then tied into sheaves ready for the steaming chambers.

The chambers in question are of an oblong shape, 18 or 20 feet long, and about 8 feet high by 10 feet wide. They are made of iron plate, rivetted steam-tight, the bundles of flax are packed quite full into them, and as soon as the doors are firmly bolted, the flax is submitted to a process of steaming for the space of from 8 to 12 hours, according to the nature of the straw, when it is fit to be removed. There is a peculiarity in these chambers which must be mentioned. It is of course well known that when steam is thrown into a chamber of any size, condensation must be constantly going on, the water thus formed would trickle in streams down the sides of the chambers. If this were permitted in steaming flax, all the water up to a boiling heat would either pass away useless, or accumulate at the bottom of the chamber. But to provide against this, and to turn this water to account, the patentee has the ceiling plates of his chambers thickly studded over with small projecting points, at the distance of about an inch apart, and as the steam rises to the top of the chamber, it condenses, and falls in a constant shower down through the mass of flax, so that it is submitted to a process of steaming and boiling at the same time. The decoction of lint stems thus formed is drawn off into barrels, and when mixed with the husks of the flax, and with chopped straw, or other edible matter, forms, according to the opinion of Sir Robert Kane, a nutritious food for cattle. I saw a quantity of this mash in course of preparation for pigs, and they appeared to eat it with evident relish. Another economical arrangement may here be alluded to. On the top of the steam-chambers plate-iron tanks filled with water are placed, which, while the flax is being prepared, becomes heated to a degree which saves a great deal of fuel, as it is passed into the boiler of the steam-engine, which furnishes power to the machines before-mentioned, and water for certain washing purposes, and also power for other machines to be referred to.

The steaming process having been completed, the flax in bundles is removed from the chambers, and, being unfastened, is passed through several pairs of rollers, to be crushed, and have the epidermis removed. During this process of rolling, it is passed from hand to hand along a trough of hot water, and washed free from all extraneous matter, and afterwards bound with a pair of wooden

clips into broad thin sheaves, when it is ready to be dried in the air in good weather, or put into drying stoves, that no time may be lost if the weather be unpropitious. This drying by stoves is not according to the usual plan, namely, the direct application of heat from furnaces, but by direction of currents of heated air, by a new arrangement of pipes and ventages.

When the flax is quite dry, it is removed to another part of the factory, where it is passed through a series of angularly fluted rollers, where the woody fibres of the plant are thoroughly broken. The broken flax is then taken to the scutching mill, where it is freed from the shove, and is then in a fit state to be carried into the loft, where it is sorted, and put up in bundles ready for sale.

From the opportunity I had of observing both the scutching mills, I think better of Wilson than Watt's. Though the latter is perhaps, equally simple, it did not seem to me to perform the work so satisfactorily as the former.

The patent process of Watt, like that of Schenck, has among others, this great advantage, that it enables the seed and chaff to be saved, which is generally lost by the cold steeping process. It is superior to Schenck's in this respect, viz., the absence of an unpleasant effluvia; the smell from the steam chambers is not in the least disagreeable, while a short distance therefrom no smell whatever is perceptible. Moreover, as already mentioned, the flax liquor is useful for feeding cattle. The husks are valued at 10s. per acre; and the value of the seed saved is estimated at about £1 per acre, making a total of £4-10. "During last year (1853) 175,495 acres of flax were cultivated in Ireland: calculating this at £ 4-10 per acre, we have the immense amount of £ 789,727-10, which can be annually saved under this factory system, but which was formerly lost in the flax hole." The shoves, or refuse woody matters, are also employed in these new works as fuel, whereby a great saving in coal is effected. At Croy works, only 25 cwt. of coal per week is required for an engine of 20 horse power, the difference being made up by consumption of the shoves produced there.

I add in this place, a report of the Committee of the Royal Flax Society of Ireland, appointed to institute an experimental trial on

Mr. Watt's system of preparing flax fibre from the straw. It is taken from the 12th Annual Report of that body:—

"Since attention was first directed to the improvement and extension of flax cultivation in Ireland, and an association formed in Belfast, in the year 1841, to endeavour to accomplish these ends, it has been evident that a great desideratum in the treatment of flax, in order to obtain a fibre of good and even quality, suited for manufacture, was the adoption of some plan by which uniformity could be arrived at, and the waste and loss arising from the imperfections of the system generally practised by individual growers obviated.

"In order to attain this end, it appeared requisite that a division of labour should be carried out, that the farmer should be merely the grower of the plant, and that persons of capital, education, and scientific skill should purchase it from him, and convert it by some effective process into marketable fibre.

"Every project, having this end in view, has, consequently, met with great attention from the Royal Flax Society and the public; and a plan, embodying points of great novelty, having been lately brought forward by Mr. Watt, and put in operation at Belfast, a meeting of those interested in the matter was held on 2nd October, at which the inventor was present, when it was arranged that a careful examination into the processes employed should be made by a committee then appointed.

"The trial was begun on 21st December; and although all the points desirable to be ascertained have not yet been fully investigated, the Committee are in a position to report to this meeting a number of facts already ascertained, which they consider of interest and importance.

"Mr. Watt's system may be briefly described as follows:—The flax straw is delivered at the works by the grower, in a dry state, with the seed on. The seed is separated by metal rollers, and afterwards cleaned by fanners. The straw is then placed in close chambers, with the exception of two doors, which serve the purpose of putting in and discharging the straw; the top, which is of cast iron, serves the double purpose of a top and condenser. the straw is then laid on a perforated false bottom of iron, and the doors being closed, and made tight by means of screws, steam is driven in by a

pipe round the chamber, and between the bottoms, and penetrating the mass, at first removes certain volatile oils contained in the plant, and then is condensed on the bottom of the iron tank, descending in a continuous shower of condensed water, saturating the straw, and forming, in fact, a decoction of the extractive matters which connect the fibrous and non-fibrous portions of the plant. This liquid is drawn off from time to time, and the more concentrated portions are used for feeding; the process is shortened by using a pump, or such arrangement as will repeatedly wash the mass, with the water allowed to accumulate. In about 8 to 12 hours, varying with the nature of the straw, it is removed from the chambers, and having been robbed of its extractive matter without decomposition, it is then passed through rollers for the purpose of removing the epidermis or outer skin of the plant, of discharging the greater part of the water contained in the saturated straw, and, while in the wet and swollen state, splitting it up longitudinally. The straw being free of all products of decomposition, is then easily dried, and is in a few hours ready for scutching.

"In the experimental trial, personally superintended, throughout all its details, by the committee, a quantity of flax straw, of ordinary quality, was taken from the bulk of the stock at the works, weighing 13¾ cwts. with the seed on. After the removal of the seed, which, on being cleaned thoroughly from the chaff, measured 3¾ imperial bushels, the straw was reduced in weight to 10 cwt. 1 qr. 21 lbs. It was then placed in the vat, where it was subjected to the steaming processes, for about eleven hours. After steeping, wet-rolling, and drying, it weighed 7 cwt. 0 qrs. 11 lbs.; and on being scutched, the yield was 187 lbs. of flax; and of scutching, tow 12 lbs. 6½ ozs. fine, and 35 lbs. 3 ozs. coarse. The yield of fibre, in the state of good flax, was, therefore, at the rate of 13½ lbs. from the cwt. of straw with seed on; 18 lbs. from the cwt. of straw without seed; 26¼ lbs. from the cwt. of steeped and dried straw.

"The time occupied in actual labour, in the processes, from the seeding of the flax to the commencement of the scutching, was 13¼ hours, to which, if 11 hours be added for the time the flax was in the vat, 24¼ hours would be the time required up to this point.

The scutching, by four stands, occupied six hours sixteen minutes. But, in this statement, the time required for drying is not included, as, owing to some derangement in the apparatus, no certain estimate could be made of the actual time required in that process. It would appear, however, that about thirty-six hours would include the time necessary, in a well-organized establishment, to convert flax straw into fibre for the spinner.

"The cost of all these operations, in the experiment, leaving out the drying, for the reasons noted, appeared to be under £10 per ton of clean fibre, for labour, exclusive of general expenses.

"A portion of the fibre was sent to two spinning-mills to be hackled, and to have a value put upon it. The valuation of the samples varied from £56 to £70 per ton, according to the quality of the stricks of fibre sent, and the yield on the hackle was considered quite satisfactory.

"On the results of this experiment, which was necessarily of a limited nature, the committee think it best to offer no general remarks. They are sufficiently favourable to speak for themselves. It remains to be ascertained whether the qualities of flax fibre, prepared by this method, are such as to suit the spinner and manufacturer. They have been informed by a spinner who has been trying some flax prepared by Mr. Watt's system, that the yarn made from it appears equal in all respects to what is ordinarily spun from good Irish flax, of the finer sorts. They believe that, before long, information will be given by several individuals who are about to carry out more extended trials on the spinning and manufacturing departments.

"The committee conceive that the most prominent and novel feature of this plan consists in the substitution of maceration, or softening, for fermentation. In the steeping of flax, both in cold and hot water, the fibre is freed from the substance termed gum, by the decomposition of the latter; while in Watt's system the maceration of the stem loosens the cuticle and gum, which are further separated mechanically in the crushing operation, and, after the drying of the straw, readily part with the wood, under the action of the scutch-mill. Before concluding this statement, the committee wish to call attention to a very curious feature in Mr. Watt's invention. The water

from the vats, in place of being offensive and noxious, as is the case with ordinary steep water, contains a certain amount of nutritive matter. This arises fron its being an infusion of the flax stems, in place of holding in suspension or solution the products of the decomposition of the gum, and other substances contained in the stems. The inventor is now employing this water, along with the chaff of the seed-bolls, for feeding pigs. It is of much interest, therefore, to note in how far this may be found practically to answer, as between the seed, the chaff, and the water, by far the greatest portion of what the flax plant abstracts from the soil would thus be returned in the shape of manure. However this may turn out, the avoidance of all nuisance in smell, and of the poisonous liquid which causes some damage among fish when let off into rivers, is a matter of some consequence.

"Appended to this report is a note of the time occupied in the different processes during the experiment, and of the number of persons employed in each.

"It is to be hoped that so promising a plan may, on more extended experience, be found fully to warrant the high anticipations formed from what is already known concerning it.

("Signed on behalf of the committee),

"Richard Niven, Chairman.

"Belfast, 3rd November, 1852."

"Appendix.

"Note of the time occupied, and of the number of persons employed in each of the processes witnessed by the committee, on the experimental trial of Mr. Watt's system of preparing flax fibre :—

	No. of persons employed.		Time occupied.	
	Men.	Women and Boys.	Hours.	Minutes.
Seeding, ...	4	8	1	15
Placing in Vat, ..	3	4	0	15
Cleaning Seed, ..	1	0	3	0
Taking out of Vat, ..	2	3	0	30
Wet-rolling and putting in drying-room, ...	1	16	2	20
Rolling for scutching, ..	0	11	1	8
Stricking for ditto, ..	0	7	4	47
Total, ...	11	49	13	15
Scutching, ...	4	0	6	16

Before leaving this Rettery I obtained the following samples :—

1. A specimen of flax straw, raised from Riga seed, in the vicinity of Wishaw factory.

2. A specimen of flax, from the same straw, prepared by Watt's patent, and valued at from £78 to £80 per ton.

3. A specimen of seed, first year's produce, raised from Riga stock, in the vicinity of Wishaw.

Also from Messrs. Leadbetter and Co. a pamphlet on the treatment of the flax plant, with a description of Watt's process. That portion bearing on the value of the flax-plant for feeding and manuring purposes, contain facts, which are, I conceive, worthy of being reprinted. See Appendix A.

I insert here a list of the samples of flax obtained from the factory of Mr. Buist, of Dundee :—

A. Riga P. D. C. unhackled.
Average price about £35.
Present price £ 46.

A. 1. The same description hackled.

B. Russian Slanitz unhackled.
Average price about £25.
Present price £35.

B 1. The same description hackled.

C. Archangel 4th sort unhackled.
Average price about £35.
Present price £50.

C. 1. The same description hackled.

In connection with the foregoing subject, it may be as well to introduce in this place, instead of bringing it into the Appendix, copy of a letter to my address from Mr. James MacAdam, junior, Secretary of the Royal Society for the promotion and improvement of the growth of Flax in Ireland, dated Belfast, 22nd September, 1854 :—

" I am in due receipt of your letter of 20th instant, and I send you the Annual Reports of the Society for 1852 and 1853, which you will find of interest in connexion with your object of promoting the growth of flax and the economy of its fibre in India. As our manufacturers are much interested in this question, and as the description

of fibre which India could produce would be so coarse as in no way to interfere with Irish flax cultivation, I have been corresponding with Dr. Forbes Royle, Mr. Montgomery, Judicial Commissioner of the Punjaub, and others, offering every information in our power, with a view to promote an object of so much importance to a large section of the linen trade, which consumes the coarse kinds of fibre. I have particularly pointed out that the present system of cultivating flax which prevails in India cannot be expected to furnish fibre in any quantity; indeed in probably so small a quantity as to make the preparation of it commercially insignificant. I have suggested the use of European seed, the introduction of the European system of culture, and the employment of intelligent persons acquainted with all the details. It would be very desirable that Government or the E. I. Company should employ some gentleman well acquainted both with the culture and preparation of flax, to go out to India, to visit all the provinces, and point out the localities where climate and soil, &c., would warrant the belief that good fibre could be produced. That if his report were favorable, there should be operations on an extensive scale undertaken to carry out the object, such as the establishment of retteries on Schenck's system, where the flax stems should be steeped, and of scutching machines, by which the fibre should be brought to a marketable state. I need not add that I shall be happy to give any further information in my power that may be required by the Agricultural Society of India."

The Annual Reports referred to by Mr. MacAdam are herewith submitted: they contain much useful and interesting information, which it may be deemed desirable to reprint, more especially the "directions for the proper management of the flax crop, compiled by the Committee of the Society," and Dr. Hodge's lecture on the flax plant. Appendix B. and C.

Observing in the Report for 1853, a favourable notice respecting M'Bride's patent self-acting scutching machine, of which MacAdam Brothers and Co. of Belfast, are the makers, I availed myself of the Secretary's offer of further information, to address him again; and asked him to procure for me a drawing of the machine in question, with full particulars respecting cost, mode of working, &c.

Messrs. MacAdam informed me in reply, that they had not any drawing of the machine, and that a sketch would convey a very imperfect idea of its mode of working: that the price of the machine, including packages, is £220, free on board at Belfast, and that they are at present making a number for different parts of the world. In order to have a complete system of machinery for scutching flax, with MacBride's machine are sent one of their own improved flax breaking machines, and some other articles, the cost of the entire system being from £280 to £300. Mr. James MacAdam, junior, states that MacBride's "machine is much the most efficient and most economical in working."* The printed notice of the working of this machine is herewith submitted. See Appendix D.

Messrs. A. Bernard and Koch have furnished me, in reply to my application, with a pamphlet respecting the manufacture of flax on Schenck's patent system. The directions, at pages 5 to 10, respecting the erection and management of retteries, or steeping establishments, may prove useful to any persons attempting the manufacture in India under the new mode. Appendix F.

Messrs. Bernard and Koch inform me that they have some very simple machinery which they have lately made up, which they consider would be perfectly adapted for India. The machinery they allude to is for the purpose of separating the fibre in a cheap way, but by a very different manner than those in use; and its great simplicity, cheapness, facility to be worked by any one, and adaptation to either hand, or horse, or any power, would, in their opinion, be very valuable in a country like India. They state that they keep this machinery private, but if any Company or Association were to take in hand the cultivation of flax in India, they would be willing to treat for it.

A new machine for cleaning the tow-waste of scutching mills has been lately brought to my notice, which may, at some future period form an useful addition to a flax factory in India; it has been invented by Messr. Calvert and Garnett, of Cleckheaton, Yorkshire. A description of it will be found in Appendix G.

* A Sub-committee of the Royal Society on scutching machines, has reported favorably on the first trial of MacBride's invention, also the Secretary of the Roan Spinning Mills, Dungannon, whose communication on the subject I have inserted in the Appendix. See Appendix E.

I received from Messrs. P. Fairbairn and Co., of Leeds, maker of flax machinery, a few copies prepared by them, for private circulation, of "a concise treatise on the cultivation of flax, and on the operations and machinery employed in its manufacture." Portions of this treatise may be deemed sufficiently interesting to be reprinted, more especially that which gives a description of Schenck's hot water system of retting. Appendix H.

THE MODE OF GROWING AND PREPARING FLAX IN YORKSHIRE.

For the following particulars respecting the culture and preparation of flax as pursued in Yorkshire I am indebted to the obliging kindness of Messrs. John and Thomas Clough :—

The seed is sown from the 20th of April to the 5th of May, two bushels to the acre. A light alluvial soil is the best suited for it, but it will grow on a stiffish loam, or on light sandy land; which must be well worked and harrowed till very fine, so that the surface be as even as can be made. After sowing broad-cast, harrow it once or twice across, to work the seed well into the ground. Considerable moisture in the land, or gentle rain is very desirable, to cause it to grow quick, which always yields the best crop. When it is between one and two inches high, it should be *very well* weeded; otherwise the weeds left in the ground injure the flax severely, as does also weeding it when it is longer. The plant comes to maturity in about four months. To judge when fit for pulling, it should assume a change in colour, similar to wheat; the stock should become yellow at the bottom, yet having a green appearance at the hop or boll (the seed-vessels).

To pull it, take as much as the hand will easily grasp, and draw it off the ground with as little mould to it as possible, leaving all the weeds behind, as they, if gathered with it, injure the sample of the seed. Then tie it up in small bundles (with a little of the flax), and lay it on the ground, until the top side is dry; then set it up, one bundle against the other, with the *dry* side of the bundles *inwards,* so that the side that has been laid next the ground may then get dry. It must remain set up until it is dry, and on rubbing the boll you find that the seed has attained its

proper colour, and then it is generally in a fit state for beating out. This should be done on a level wooden floor with a flat beater. When it is quite clean, tie the flax up again in small bundles as before, when it may be stacked or stored away until wanted for the retting process. The greatest care must be used in opening it out, spreading it, beating and tying it up again, to keep it as straight as possible, and perfectly dry.

Retting.—Spread the straw on the ground (on a grass field) as evenly as possible three or four stems thick, and each row three inches from the end of the other, that they may not get entangled. By imbibing the dew at night, and the sun in the day time, the bun of the stem becomes detached from the outer skin or fibre and tender, so as to separate from it on the upper side. This may be ascertained by rubbing a few stems in the fingers, when it should easily separate. Then put a long rod under one end of the flax and turn it evenly over, so that the under side is brought to the top; and let it remain until it separates from the fibre as before noted. When the whole has become tender and perfectly dry, gather it up carefully, and make it into bundles larger than before; then stow it safely away until it is required to be manufactured.

Manufacturing Process.—Take as much of the retted flax as you can hold firmly in the left hand, by the upper or seed end of it, and with the right hand bend it over the stock close to the left hand, to break the stem well; (and it is important not to let any stem escape the grasp in any part of the process), then spread out the lower or root part like a fan; (still held firmly together by the left hand) and lifting up the breakers, or breaking machine, introduce the flax gradually betwixt the teeth, and by lifting it up and down, and repeatedly turning the flax over, break or chop it until the whole of that part of the flax is broken. After this pass it through the right hand to make it straight again; then, taking hold of the root end in the left hand, break the seed end in the same way. When sufficiently broken, take hold again of the seed end, and put it so that a small part may hang over the stock, and strike it with the swingle, so as gradually to beat the bun out of it, moving it backward and forward with the left hand in which it is held, at every stroke, until the whole of the bun is beaten out of it at that (the root) end. It must then be

gently drawn through the hackle, beginning with a little at a time, and, when well straightened, take the hackled end in the left hand and draw the seed end through the hackle, as it will not swingle well without it. When well hackled lay it (the seed end) over the stock, and swingle it well until clean as the other end; then pass it through the hackle to give a finishing stroke to the whole of it. If one handful is found too small, put two together, and then after hackling it, give it a twist or two, to keep it together. The usual way of tying or making it up, is by twisting about one-third the length of the flax, and wrapping it round the other, securing the end of the twisted part, so that it will not come undone: it may then be laid and screwed into bales, the same as hemp is done.

Note.—Previous to beginning to work, the *breakers* should be placed firm on the ground, the front part a little higher than the side next the workman: and a stone should be placed between the legs, to keep it firm. In taking hold of the handle of the breakers, he must lean over it, so as to bring it close up to his left shoulder, to enable him to move his left hand, in which he has the flax, backward and forward, as it (the flax) may require, to complete the breaking or chopping of it. Should the chopping part become dull, the contrary end of the breaks may be used, by taking the pins out, and putting them in at the other end.

The *swingle stock* should be placed *firmly*, with a heavy stone on the legs of it to keep it so, and also perfectly upright. A bow made of a piece of cane, with a leather thong or piece of catgut attached to it, should project 18 inches from the left side for the swingle to fall upon, which will prevent the swingle being broken; and moreover, the spring from it assists the workman in his operation.

The *hackle* should be placed about two feet to the right side of the stock, to be ready for use, and the teeth of it must be always kept perfectly bright, or the flax will not pass through it. When not used, it should be well oiled, and the oil dusted well with quicklime, which will prevent it rusting.

There are two kinds of swingle: the one with a tail is called a "tailed swingle," and is used for dressing the finer flax; the other is called a "cleaver," and is used for dressing the rougher flax.

A few words, in conclusion, before quitting the subject of Flax. All who have had the opportunity, which I have had, of witnessing the preparation of this staple according to the processes of Watt and Schenck, cannot fail to be struck with the improvement over the old mode; and how well they are adapted for the country into which they have been introduced, and are now, apparently, working with such advantage, as to be likely, in all probability, to supersede the former system. The question in which *we* are mainly interested is, are they likely, to be as well adapted for India, if flax preparation be taken up on a scale sufficiently extensive to render the article one of commercial importance? That is to say, would it be advisable for the capitalist, or for an association, to enter on the business according to the *old* or the *new* processes? Much may be said, perhaps, on both sides. Mr. MacAdam, the Secretary of the Royal Flax Society of Ireland, is of opinion,—as will be seen from his letter given in a previous page,—that the establishment, in India, of retteries on Schenck's system, and the introduction of recently invented scutching machines, is very desirable. Others appear to be of a similar opinion, especially those who have not resided in India. Having given the subject some consideration, I cannot agree in this opinion, at least as a primary measure, though it may probably at some future time, be acted on with advantage. Taking into account the climate of India, the character of the people, and the fact that attempts hitherto made to establish manufactories requiring the use of delicate, complicated and expensive machinery, having in so many instances proved disastrous undertakings to the originators, I am, of opinion, that it would be better to commence, at least, with simple machinery, adapted for hand labor, such, for instance, as are still in use in Yorkshire, and other parts of England, similar to that referred to in a previous page, which I have procured through the kindness of Mr. Clough.* The "simple machinery"

* This machinery is now deposited in the Society's Museum, for the inspection of Members and any other persons interested in flax preparation. While this sheet is passing through the press, (9th May, 1855.) the writer has had an opportunity of perusing Dr. Royle's new work on the *Fibrous Plants of India,* received by the last mail, in which, at page 216, occurs the following remark, confirmatory of the opinion advanced above. "Many

which Messrs. Bernard and Koch allude to, might, perhaps, answer the purpose, but in the absence of all details, in respect to price and mode of working, it is impossible to come to any conclusion regarding it. Mr. Wilson, of Redford factory, has also, it would appear, recently invented a small self-acting scutching machine, stated to be capable of scutching 3 cwt. of fibre per week, with the labour of two boys, to cost £15, and to give a yield greater by 10 to 15 per cent than the ordinary scutch mill. He has submitted this machine for the opinion of the Royal Irish Flax Society, but they have not, as yet, reported on it. As regards improved modes for steeping the straw, such as the hot-water system of Schenck and Watt, the question arises whether such are required at all for a hot climate. The straw which is pulled at about the commencement of the hot season, say the early part of March, could be stacked for a month or six weeks, by which period the water in tanks being of a good natural temperature—86° to 90°, should need no heating previous to the immersion of the straw. A longer time would, probably, be necessary than the period required by the new patent processes, but this would be a matter of trivial moment, compared to the difference of outlay necessary between the natural and artificial modes of steeping.*

improved methods of preparing Flax have since then been discovered, [alluding to the publication, some years ago, of a pamphlet by the " Indian Flax Society,"] and are now employed in Europe, and will no doubt, be found useful in an extended state of the culture in India. But at present the simplest tools are the most suitable, such as those formerly very generally employed, and still used in many places in this country, [England] and such as are required for cleaning by hand instead of by machinery." *A. H. B.*

* In the work referred to in a previous note, *(The Fibrous Plants of India)*, I see it stated by Dr. Royle, that at the meeting of the Royal Agricultural Society held at Lincoln in July, 1854, a machine, manufactured by Messrs. Ransome, was exhibited and worked by Mr. E. Davy, of Crediton, in which Flax fibre was separated from the cuticle and boon by mechanical means, and without any steeping. It is also stated in the Annual Report for 1854 of the Royal Society for the promotion and improvement of the growth of Flax in Ireland, that,—" the plan of preparing the fibre without steeping has, on former occasions, been alluded to. It is now (Nov., 1854,) being carried out practically, on a very large scale, by Mr. Roche, M. P. for County Cork ; and the fibre is stated to find a ready market in England, for certain

I have offered the above remarks on the assumption that the indigenous plant can yield sufficient fibre, to render it worthy of cultivation for that object as well as for seed. I believe it is the opinion of some, whose judgment is entitled to deference, that the nature of the plant is such that it cannot be cultivated for the fibre with much prospect of success: I am not, however, aware, if it has received *a fair trial on an extended scale;* but I do know, from the records of our Society, that experiments, on a limited scale, with foreign seed, have afforded specimens which have been favorably reported on. If, however, the yield of fibre from the indigenous plant is low, compared to those from colder countries, it is only another argument in favor of an economical method of work to cover the expenses,* and against the outlay necessary for hot water apparatus, and a series of complicated machinery. Under any circumstances, might it not be worth the while of interested parties resident, say, in Behar,—(or in other parts of Lower India) where the indigenous plant is so largely grown for the sake of the seed, to attempt the production of the fibre also, by holding out inducements to the natives to improve the cultivation, with the view of ascertaining whether the character of the plant could not thereby be improved? We know that, at present, the flax is not unfrequently intermixed with other crops, or sown outside of them in lines, and far apart,—which method, the sowing far apart, though favorable for the production of seed, is unfavorable for the production of fibre, as it has the effect of stunting the growth to a foot or fifteen inches, giving it a large branchy head, full of seed capsules, with scarcely any fibre on the stems. This present faulty system of culture might probably be remedied were the buyer of the seed to offer to purchase the straw also from the cultivator, at a certain rate per ton, on the understanding that the European method of cultivation, such as good tillage, thicker sowing, &c., were attended to, and the crop raised separately from all other "rubbee" produce. If, after a fair trial,

coarse purposes. The price obtained is considerably under that of steeped flax, but, as the expense of steeping is avoided, it is stated to be sufficiently remunerative." *A. H. B.*

* I believe that the experiments made in certain parts of Behar, some 12 years ago, were not found to succeed, because they were conducted on too expensive a scale.

it were found that the indigenous plant possessed peculiarities of habit which could not be remedied by an improved mode of culture, then it would be time enough to see what could be effected by the introduction of foreign seed; and lastly whether the climate of the Lower Provinces of India is so entirely inimical to the production of good fibre (as some suppose), as not to be overcome by the substitution of new seed, or a better system of culture.*

No time is more favourable than the present for bringing this important subject prominently to the notice of the Indian public. The Russian war, and its effects in enhancing the cost of coarser descriptions of flax, as well as the increasing demand for this material, which has not been kept up to by the supply, has, of late, caused considerable attention to be directed, by all who are interested in the linen trade of Great Britain and Ireland, to other means of obtaining coarse fibre for a certain class of fabrics; and India has been frequently adverted to as the country from which such supplies might be obtained. It would appear from recent Parliamentary Returns,† that the total quantity of Flax imported into the United Kingdom *from all parts*, in three years, viz. from 1851 to 1853, has been 225,268 tons. Of this quantity 153,170 tons came from Russia; and the

* "The Indian plant, called *Ulsee* or *Tesee*, may be considered a variety which has acquired certain characters from the peculiarities of soil, of climate, and of long and peculiar culture. It is always short, probably not more than 18 inches in height, much branched, loaded with bolls, which are filled with large, ovoid plump seed. That this retains its character even in other situations, appears from a fact, of which I have been informed by Mr. MacAdam, the able Secretary of the Society for the promotion of the growth of Flax in Ireland. The Society having imported some seed for experiment from India, found that the plant did not grow beyond 14 or 18 inches. But that it is also ready to change its habit, is evident from experiments which have been made in India. I have also been informed that in a recent experiment made by Mr. Burn in Sindh, with thick sowing and irrigation, it grew at once to upwards of 2 feet. I have no doubt that with a repetition of the process of thick sowing for a few times, the Indian seed would produce plants with tall, straight, and little branched stems, each with but compatively few bolls and seeds."—*(Royle's Fibrous Plants of India.)*

† "Returns of the total quantities of Flax and Hemp respectively imported into the United Kingdom in each year from 1801 to 1853, ordered by the House of Commons to be printed, 26th June, 1854."

remaining quantity, 72,098 tons, (with the exception of a few tons received from Australia), was of the growth of other foreign countries. "The quantity of linseed exported from India to the British Islands, was, in 1850, 26,979 quarters, and in 1851, 93,814 quarters. In 1852 and 1853, of which we have not the tabular returns before us, it is known that the quantity was much greater than in 1851. There are no documents in our hands which shew the proportion shipped to America, but it is believed to be fully a half to two-thirds of the quantity sent to Great Britain. Supposing that the entire export to all countries during the last two years reached 200,000 quarters annually, and taking the produce, at 20 bushels per acre, it may be calculated that in the peninsula of Hindostan, 80,000 acres of flax are yearly cultivated. At the same rate of yield obtained in Europe, this breadth would produce 20,000 tons of fibre, which at £35 per ton would be worth £700,000."—*(Belfast Linen Trade Circular, August,* 1854.*)*

In connection with the foregoing statistics and extract, bearing on the utility of economising the fibre of the flax plant, as now generally cultivated in India, I beg to add another extract from a letter to my address from the Secretary of the Dundee Chamber of Commerce, as encouraging to parties desirous of entering into the speculation.

"It must be borne in mind, that if, on account of the hot climate, the finest flax cannot be raised in India, still there is such a range in the linen trade, that *almost any description of flax,* if cheap enough, can be used. Russian* and Prussian Flax, which, would be of no use in Leeds or Belfast, is consumed regularly in Dundee,

* The majority of the samples I have received from Mr. Buist, as detailed in a previous part of this memorandum, are, I believe, of similar quality to specimens in the Society's Museum, raised by Messrs. Wallace and Leyburn, at Monghyr and Arrah.—*A. H. B. Nov.,* 1854.

Since the above was written, I have had an opportunity, on resuming charge of my office, of examining the specimen of flax submitted last year by the Agricultural and Horticultural Society of the Punjab. It appears to me to be equal to the best of the Russian specimens, noted above, and superior to most of them. The favorable report by the Fibre Committee of the A. and H. S. of India on this flax will be found in another part of this volume.—*A. H. B. May,* 1855.

Arbroath, Kirkaldy, Montrose, &c., &c. As India is distant, and the freight must be a heavy charge, it would be of importance to have it *well cleaned*, so as not to pay expences on what is useless, but in all cases this (being well cleaned) ought to be paid attention to, as it will not only repay the producer, but likewise take the market better."*

It has been suggested to me by Mr. Clough, that the tow of the flax could be turned to profitable account in India, if made into bags for packing linseed, which bags could be readily sold in England, independently of the seed.

No. 2.

Memorandum regarding China Grass, Plantain Fibre, Oils, Cotton, &c., &c.

China Grass.—I availed myself of the opportunity, while at Leeds, to call on Messrs. Marshall and Co., of that town, in the hope that I might be able to obtain some practical information respecting the speediest and most economical mode of removing the fibre from the stalk of the *Bœhmeria nivea*. In this I was disappointed. Messrs. Marshall have paid considerable attention to this fibre, with the view of bringing it into general use for a variety of purposes; but their processes are applied solely for the preparation into thread and cloth of the raw fibre in the state in which they receive it from China. They had not, they informed me, instituted any experiments on the "Rheea" of Assam, but would willingly do so, on being furnished with a supply of the stalks, and gladly submit the result of such experiments to the Society. This offer has been communicated in my letter to Mr. Robinson of the 24th of October, 1854. Among the specimens

* "It is certain that all hot countries, or those which, like Russia, have a short, warm summer, cannot furnish fine flax fibre; but it is precisely coarse fibre that is now so much wanted. The bulk of fine flax used in the linen manufacture is trifling compared with the coarse. A Belfast or Leeds mill of 5000 spindles will consume only 200 to 250 tons of flax annually; while one of the same size at Dundee or Kirkaldy, will consume 1000 to 1200 tons. Belgium, Holland, France and Ireland can supply all the world with fine fibre; but Russia and Egypt cannot keep pace with the demand for coarse." —*Extract of a letter from Mr. MacAdam to Dr. Royle, quoted in "The Fibrous Plants of India."*

shewn at the Great Exhibition of 1851, of the different stages of preparation, dressing, and manufacture of China grasses, the jury considered the series exhibited by the above firm, the most suitable for manufacturing purposes; and they add:—"This house is deserving of great commendation for the trouble and expense it has incurred in testing the utility of this material." I allude to this fact, to shew that any experiments the Society may wish to have instituted with the "Rheea," will probably receive justice at the hands of Messrs. Marshall and Co. I annex a list of specimens (submitted herewith) of the raw material (China Grass) in different stages, which they presented to me :—

No. 1.—Prepared from the raw fibre into a state of floss.

No. 2.—The same after being hackled.

No. 3.—The same made into thread.

No. 4.—The same in a bleached state.

The thread, it will be observed, is finer and more lustrous than that made from flax.

Plantain Fibre—Another vegetable fibre—that of the Plantain,—has also engaged my attention. A gentleman, (Mr. J. B. Sharp,) with whom I was in communication on this subject, just previous to my departure from London, has very recently taken out a patent for the invention of improvements in obtaining and preparing the fibres of Plantain, and certain other vegetable substances, for manufacturing purposes. A copy of the specification, with drawings of the implements to be employed, has been obligingly furnished to me by Mr. Sharp, which, with specimens of "Plantain paper," also received from the same gentleman, are now submitted to the Society. Mr. Sharp informs me that the Company which has been formed to work out this patent, intend commencing operations in the first instance, in the West Indies, but will probably, extend them, afterwards, to the East. The experiments of Dr. Hunter, at Madras, and others, shew the various purposes to which the stem of the Plantain might be applied, instead of being allowed, as at present, to rot on the ground after the fruit has been gathered. On a rough calculation it is stated that each tree will yield about 4lbs of fibre, or 12,000lbs per acre. But, independently of a good fibre, a large

quantity of towy matter can be obtained admirably suited, when mixed with rags, to the wants of the paper manufacturer, as the specimens above referred to, and finer specimens which I have had an opportunity of inspecting through the kindness of Dr. Royle, will shew. Any one who has paid the least attention to the subject must be aware that, to secure any additional cheap materials for paper making, is always an important object; but more especially so at the present time, when the supply of rags in the United Kingdom is less than it was twenty years ago, while the manufacture of paper has considerably increased, and is annually increasing. It would appear from recent parliamentary returns, that during the last four years (1850-53,) England has imported from foreign countries an annual average of 8,000 tons of rags, and this too in the face of rags produced by a population of upwards of 27 millions of inhabitants in Great Britain and Ireland, and notwithstanding the large quantities of bagging and other descriptions of linen and cotton wrappers, old sails, cordage, and old navy stores, &c., &c., which are bought up. From a paper handed me by Mr. Sharp, I beg to introduce the following extract on this subject: —"Much dependence cannot be placed upon foreign supplies of rags. The total importation is, at best, but a small per centage of 110,000 or 120,000 tons, which is the entire consumption of material for paper in this country. And of this small supply, we are, to a great extent, deprived by the Americans, who are buyers in our market, to supply the deficiency to which the paucity of their own production exposes them. * * * * Taking next, our own increased consumption of paper, it will be seen by the following statement, what are the details, and what the progressive advance in the production and consumption of paper in this country:"—

(Here follows a statement which I need not introduce.)

He then goes on to observe:—

"It will here be seen, that in less than 20 years after the equalization of the duty, by the reduction of that on first-class paper from 3d. to 1½d. per pound, the quantity brought to charge was more than doubled; that made in the last 5 years averaging annually above 80,000,000lbs over that of the 5 years preceding the reduction; and the make of last year was nearly 107,000,000lb in excess of the first 5 years' average; and more than 23,000,000lbs—above 10,000

tons—higher than that of the preceding year, 1852. Nor is this the limit of the question. By official accounts for the present year, it appears that, notwithstanding the large and unprecedented augmentation of last years' production, the first quarter of the present year (1854) exhibits an addition to the quantity made in the corresponding quarters of last year, of nearly 3,000,000 lbs, or at the rate of above 10,000,000lbs per annum; equivalent to about an additional 5,000 tons of paper."

The above extract shews forcibly the expediency of furnishing the paper manufacturers of England with supplies of raw materials from our Colonies to meet the rapidly increasing demand for so indispensable a requisite of civilized life: and it is satisfactory to know that we possess in the plantain, and other of our Indian white fibrous plants, such as the aloe, pine-apple, &c., large resources of raw material for that purpose, needing only skill and capital to turn them to profitable account.*

In accordance with the intention communicated in my letter to Mr. Robinson of the 24th July, 1854, I beg to announce having presented to the Society of Arts, on behalf of our Society, certain specimens of oils, as detailed in the margin, with a paper descriptive of each, for publication in their Journal. This may cause attention to be drawn to them, and thereby lead to further enquiries from persons interested in such products. The following

Oils and Tallow.

1. "Ramtil." Verbesina sativa.
2. "Jychee." Euphorbia Jychee.†
3. "Desee Akroot." Aleurites triloba.
4. "Junglee Badam." Sterculia fætida.

* Since the above was written, I have read an account, in *Hooker's Journal of Botany*, for Jan., 1855, extracted from the *Antigua Weekly Register*, of the 24th October, 1854, of a machine for cleaning the plantain fibre. This machine, the invention of the Honorable Francis Burke, the Puisne Justice of Montserrat, is reported to be most simple in its operations, and of most moderate cost: two most important recommendations. A fuller account of it, extracted from the above-named newspaper, will be found in the Appendix. —*A. H. B.*

† I have given it the specific name "Jychee," for the present, as I believe it to be an undescribed species.—*A. H. B.*

extract from the Reports by the Juries of the Great Exhibition *on the oil series* is so appropriate to this subject, that I make no apology for introducing it in this place :—

" Among the oils exhibited (of which there is a very great number,) there are several which are admirably suited for various purposes, but which, nevertheless on account of their juice, depending, generally, on local circumstances, such as cost of freight, &c., are very little, or not at all, used by our manufacturers. The knowledge, however, that such oils may, at any time, be procured in large quantities, is of great practical value; because, not only is it possible that, by the introduction of improved machinery, or by increased facilities of conveyance, their price may be reduced; but the very existence of such substances tend to equalize the market value of those oils now generally employed ;—and should at any time, accidental circumstances cause the price of the latter to advance, these substances would then be most advantageously introduced, and would, probably, ere long, altogether supersede the oils in the place of which they had been originally imported. Thus the price of tallow is, to some extent, regulated and kept in check by that of palm and cocoanut oil; and should the value of the latter oils at any time rise, there are a number of other solid vegetable oils, equally good for all practical purposes, which, with a very little trouble, might be had in almost any quantity. There are however, some special purposes in which oils are used, for which it would not be so easy to find good substitutes; such, for example, as the lubrication of fine machinery, and the operations of the wool-spinner. It is probable that among the numerous little known oils of tropical countries, there may be many as well suited for both of these purposes as those now generally employed ; good specimens of new oils are, therefore, always of considerable practical interest. Whilst, on the one hand, it is desirable to draw the attention of manufacturers and consumers to the numerous foreign and colonial oils not at present imported into this country,—it is at the same time also useful to point out how greatly the value of such oils depends on the care bestowed on their preparation, especially as regards cleanliness of the seed, and the exclusion of impurity of all sorts in the process of extracting the oil."

Previous to transferring the oils, above referred to, to Mr. Foster, the Secretary of the Society of Arts, I shewed them to Mr. G. F. Wilson, the Managing Director of Price's Patent Candle Company, who, I was informed by Dr. Royle, (who favored me with a letter of introduction) took considerable interest in all such products ;— this I found to be the case. Mr. Wilson was more particularly struck with the oil of the "Junglee Badam," which was quite new to him, and I believe it to be altogether unknown in England : it is not included in the large collection of foreign oils submitted at the Great Exhibition. He expressed a desire to experimentalize on it, if furnished with a quantity sufficiently large to admit of his doing so. Mr. Wilson further intimated his readiness to report on any description of oils respecting which the Society may from time to time be desirous of obtaining really practical information, in regard to quality, value, useful properties, &c., &c. I would take this opportunity of expressing the gratification I derived from an inspection of the works of Price's Patent Candle Company at Vauxhall, which was alike interesting and instructive. This company, I may observe, possess very large establishments, consisting of five distinct manufactories, besides plantations of cocoanut trees in Ceylon. With a capital but little short of half a million sterling, and employing 800 work people, they divide annually in profits a sum equal to the gross returns of some of the largest continental works, between £40,000 and £50,000. I beg to submit a candle, which I received from Mr. Wilson, as a specimen of the quality his company supply at 10½d per ℔, for comparison with those of Indian manufacture. I believe the candles prepared at the Cossipore factory by Messrs. Sainte Brothers are about the best manufactured on this side of India, the cost of them is, I understand, 10 annas (say 1*s.* 3*d.*) per ℔.*

In connection with the above subject, and under the impression they may prove useful, I will close this section with a few

* I have also included in Appendix J, a printed letter from the same gentleman (Mr. Wilson) to the address of Sir William Hooker, treating on oils in general ; and furnishing a few useful hints for travellers in foreign countries in respect to their comparative value. These hints may prove useful to correspondents of the Agricultural and Horticultural Society of India.

observations respecting tallow, for which I am indebted to Mr. John Clough :

"We import annually from India two millions of ox and cow-hides, salted and brined, wet and dry, independent of all tanned and otherwise dressed; also of all sheep and goat skins. From this multitude of animals we have had hitherto little or no tallow. What becomes of it? Our small-sized cattle produce from 1 cwt. to 1½ cwt. each; but allowing only half a cwt. for the two millions *slaughtered** in India, it would give 50,000 tons of tallow, which is full two-thirds the quantity that we import from Russia and other countries. It is now selling at 66*s* to 68*s* per cwt., yet scarcely any reaches us from India. The quality of what has come only requires care to send it in a *clean state*, to make it fully equal, if not superior, to any imported.† The process of melting it is very simple, viz., let all the fat part of the animal (from intestines as well) be cut off as soon after death as possible, and hung up to cool, but no risk to be run of getting putrid. Then cut in small pieces, and gradually heat it in a pan, (an iron one is the best, being less liable to burn), as the color is of the first consequence in the operation. As soon as it boils, take off the melted fat with a tin dish or pan, pouring it though a wire sieve (not copper wire) into a vessel to cool; and continue taking the fat as long as any can be got, not discolored by the fire. Put aside the dregs for a future melting, when, by additional fire, more tallow may be had from them, and, although of inferior quality, will bring in this market within 5*s*. to 10*s*. per cwt. for the best quality, for making soap. Here, after all the tallow is got from them, they are put in a square press, extracting what remains in them, and when cool the press is emptied of the square cake remaining in it, and sold for feeding dogs, poultry, &c. under the name of "*graves*," and now worth 12*s*. to 15*s*. per cwt. The tallow is better in both cases to be re-melted

* A comparatively small number are slaughtered; a large proportion die of disease, and their carcases are lost for the purpose of tallow.—*A. H. B.*

† In a letter dated 31st. Jan., 1855, Mr. Clough writes, "the prospect of peace has caused tallow to fall in price. At a public sale last week, E. India sold for 55*s*. per cwt., *best* Russian only 54; thus you will see which of the articles was preferred by the trade."—*A. H. B.*

in a pan having water *at the bottom* of it, which, after gently stirring and cooling in the pan, a little will draw any impurity that may remain in the tallow to the bottom of it, betwixt it and the water. Then with the tin pan with the handle, gradually take as much tallow as you can, without disturbing the impurity at the bottom of it, and pour it into the cask or case intended for it to be exported in. It is desirable to case each package round and at the bottom with a coating of the tallow first, to prevent any running out at the crevices, and not to put the tallow too hot into the packages. Let the water and impure tallow stand to cool in the pan, and when set, it may be cut out, and the impurity scraped from it, and may then go in the next boiling or melting."

ROOM DYE OF ASSAM.

The specimens of this dye (the produce of an unnamed species of *Ruellia*) and cloth dyed from it by the Assamese, which were submitted to our Society by Major Hamilton Vetch, have been transferred by me to the Society of Arts, with a brief notice regarding them for publication in their Journal. Mr. Foster has promised to endeavor to obtain and report to our Society an opinion on the probable value of this dye in the English market.

SPECIMENS OF VEGETABLE FIBRE.

1. "Rheea" of Assam. *Bœhmeria nivea.*
2. "Mŭddár." *Calotropis Hamiltonii.*
3. "Jubbulpore Hemp." *Crotalaria tenuifolia.*

I have also transferred the samples of vegetable fibre, noted in the margin, with a short communication respecting them, to Sir W. Hooker, for deposit in the Museum attached to the Royal Botanic Gardens at Kew; which Museum and Gardens I took an opportunity, during my brief residence in London, of inspecting, and with which I was much gratified. The specimen of "Jubbulpore Hemp" is, I believe, new to the Kew Museum; at least I did not remark any of it: though it is not altogether unknown to the commercial world, a small quantity having been forwarded to the English market by Mr. Williams of Jubbulpore, which realized £28 per ton.

COTTON.

While at Manchester, I had interviews with several gentlemen who are much interested in the cotton trade of India; among others with Mr. Bazley, President of the Manchester Commercial Association; and brought to their notice certain specimens of the staple raised from foreign seed in various parts of the country. Of these Mr. Bazley formed a favourable opinion, but more especially of some cotton grown in the vicinity of Calcutta from Sea-Island seed, which, he remarked, was admirably suited for their purpose, and would always command a good price. He expressed his readiness to pay a fair price for any cotton of good quality raised in India; and moreover, intimated his willingness to receive and report on any samples of cotton the Society might send him.* From Mr. Bazley I received the following specimens, which are herewith submitted, viz.:—

No. 1. Sample of Sea Island cotton, valued at 2*s.* per ℔.

No. 2. Sample of Australian cotton, raised at Melbourne, valued at 2s. 6d. per ℔.

Mr. Bazley is of opinion that seed of the above stock, No. 2, originally of Sea-Island description, would succeed better in India than seed imported direct from the United States.†

VEGETABLE, FLOWER, AND OTHER SEEDS.

The result of my personal communication with Mr. Carter of Holborn, having been already detailed in my several letters to Mr. Robinson, I need not now enlarge on it. I trust the Hop seed and *white* Flax seeds, which I requested him to forward to the Society by an early opportunity, have reached in good condition, as also the grass seeds presented to me by Mr. McNab, the Curator of the Royal Botanic Garden at Edinburgh, and by Messrs. Lawson and

* The Society have already acted on this offer, by sending a portion of the fine cotton recently raised in their garden from Sea Island seed from Seabrooke's plantation, in Eddisto Island, Charleston, S. Carolina.—*A. H. B. May*, 1855.

† Mr. W. Blundell, of the Firm of Leach, Rawson & Co., of this city, has placed the Society in a position to test this opinion, having recently presented them with a good quantity of this particular description of seed for general distribution.—*A. H. B. May*, 1855.

Son of the same place. I may mention, in respect to the *white* Flax seed, that it is stated to have been discovered by Sir R. Schomburgh in the course of his travels in Guiana, growing on the banks of the river Orinoco; the plant is taller than the ordinary blue flowered variety cultivated in Europe, and is said to produce a finer and whiter fibre.*

Having also acquainted the Society in the lengthy memorandum enclosed in my letter to Mr. Robinson of the 19th of August last, of the result of my visit to Messrs. Lawson and Son's seed stores, and extensive nurseries in Edinburgh, there is no occasion to recapitulate what has been advanced, except to reiterate my opinion that it will prove advantageous to the Society, to indent on that firm for annual consignments of vegetable seeds, and also of agricultural seeds of certain descriptions.†

COMMISSIONS EXECUTED.

I trust the arrangements I have made for a new medal die, gold and bronze medals, and galvanized iron wire, bell-glasses, and cast iron labels for the use of the Garden, will meet the approval of the Society. All details connected with these commissions have been incorporated in my several communications to Mr. Robinson, the Acting-Secretary.

PLACES VISITED.

I should observe that I have taken opportunities of visiting as many gardens, exhibitions, &c., as my brief residence has admitted, with the view of acquiring information which may prove serviceable in my capacity as Secretary of the Society. Among others I may note the following:—

1. The Garden of the Horticultural Society of London, Chiswick.
2. The last Horticultural exhibition of ditto, for 1854.
3. The Garden of the Royal Botanic Society of London, Regent's Park.

* A small portion of this seed germinated very freely in the Society's garden in January last. The rest has been reserved for a better trial in Nov. next, which is the proper time for sowing in Bengal.—*A. H. B. May*, 1855.

† The Society have acted on this recommendation,—*A. H. B. May*, 1855.

4. The last Horticultural exhibition of the Royal Botanic Society of London, 1854.

5. The Gardens and Museum at Kew.

6. The Crystal Palace and Gardens.

7. The Garden and Museum of the Royal Botanic Society, Edinburgh.

8. The Experimental Garden of the Horticultural Society, Edinburgh.

9. The Nursery Gardens of Messrs. Peter Lawson and Son, Edinburgh.

10. The Museum of the Highland and Agricultural Society of Scotland, Edinburgh.

11. The Nursery Gardens of Mr. Turnbull, Perth.

12. The Nursery Gardens of Messrs. Peter Drummond and Sons, Stirling.

13. The Agricultural Museum of ditto, ditto.

14. The Gardens attached to Drummond Castle, the seat of Lord Willoughly D'Eresby, Crieff.

15. The Gardens at Shrublands, Coddenham, Suffolk, the seat of Sir W. Middleton.

ANALYTICAL INDEX TO THE TRANSACTIONS AND JOURNAL OF THE SOCIETY.

I beg to submit, in conclusion, an analytical index to the Transactions of the Society, Vols. 1 to 8, and to the Journal, Vols. 1 to 8, as far as yet published. This Index has been prepared during my passage from India and back. I trust the Society may consider it worthy of publication. It has been made under the impression that it will prove serviceable to members and the public at large, who may be desirous of consulting these works for the various interesting, and, in many instances, important papers which they contain,—contributions to the Society during the last thirty years.

APPENDICES.

APPENDIX A.

Value of the Flax Plant for Feeding and Manure Purposes.

Flax liquor by Watt's process. Report by Professor Anderson of Edinburgh.

I have examined the flax liquor, and I find it to contain, in the imperial gallon, the following :—

Total Solids, ...	108·1	grains.
Inorganic Matters, ...	357·5	,,
Of which Phosphates, ...	17·0	,,
Nitrogen and Organic Matter, ...	14·7	,,
Corresponding to Proteine Compounds, ..	93·3	,,

In its composition, then, this liquor may, perhaps, be best compared with distillery dreg; but it is difficult to make an accurate comparison, as the latter varies so much in the amount of solid matters which it contains, being sometimes much poorer, sometimes much richer, than this fluid.

At a meeting of the Chemico-Agricultural Society of Ulster, held on Friday, the 3rd December, 1852, Dr. Hodges gave an analysis of the liquid obtained in Watt's Patent Flax Process, and an account of the new process of preparing flax, patented by Messrs. Watt & Leadbetter, which, he said, offered the only practical method of economising the matters which are separated from the flax plant in its preparation for the manufacturer, which had hitherto been proposed. The liquid which remains in the flax vats employed in the new process possessed none of the disagreeable qualities of the ordinary steep-waters. It was free from smell, and in taste and colour somewhat resembled an infusion of senna leaves. It was, in fact, a strong tea, containing, unchanged by fermentation or putrefaction, the soluble matters of the stem of the flax plant. It was, at the present time, advantageously used at Messrs. Leadbetter's works in feeding pigs. As it was desirable

to ascertain the exact composition of this liquid, and its nutritive value, he had procured a sample of it from the Bedford-Street works, and had it submitted to chemical examination. The following were the results :—One gallon evaporated to dryness gave :*—

Of organic matters, ...	353·97 grains.
"Earthy and saline matters, ...	163·83 ,,
Total amount of solid matter, ...	517·80 grains.

The organic matters afforded, on analysis, 14·79 grains of nitrogen.

The earthy and saline matters were found to possess the following composition :—

Composition of the ash of the steep-water of Flax.

	Per cent.	In a gallon.
Potash, ...	27·17	44·63 grains.
Soda,..	3·18	5·12 ,,
Chloride of sodium,..	21·58	34·61 ,,
Lime, ...	5·91	9·49 ,,
Magnesia, ...	4·60	7·40 ,,
Oxide of iron, ...	0·83	1·33 ,,
Sulphuric acid, ...	15.64	25·11 ,,
Phosphoric acid, ..	5·66	9·01 ,,
Carbonic acid, ...	12·43	19·96 ,,
Silica, ...	3·00	4·83 ,,
	100·00	161·49

Dr. Hodges stated that the flax liquid possessed considerable feeding qualities.

Flaxseed, Capsules, &c.

The following is reprinted from the proceedings of the Royal Flax Society. To many parties turning their attention to flax for the first time it may be new :—

Report of Analyses of Different Products of Flax, by Sir Robert Kane.

The question of the utility of the husks of the seed-vessels of the flax plant, as food for cattle, having become of considerable practical importance in Ireland, especially with regard to the methods of treatment of the plant recommended by the Flax Improvement Society, I

* This liquor may be drawn off at any degree of concentration required.

was commissioned by that Society to ascertain, by chemical analysis, the constitution of those husks, so far as related to those elements on which the nutritive value of articles of food is usually considered to depend, and to report how far, according to my opinion, those materials really possessed nutritive properties.

It appeared, however, on commencing this investigation, that the examination simply of the husks of the seed vessels would lead but to unsatisfactory and limited results, and that it would be much preferable to connect, with that examination, the analysis, under a similar point of view, of the flax-seed, as well as of the pressed cake remaining of the seed after the extraction of the oil; and, further, to examine the seed-vessel, considered as a whole, as it is separated from the plant by rippling, containing its seed—in which state it is also frequently employed as food for cattle.

The process adopted in the analysis of these bodies was to ascertain, with the utmost accuracy, that the present condition of science admits, the proportion of nitrogen, of inorganic ash, and of phosphoric acid, which they contained. It is known that, in every organic substance used as food, there is abundance of carbon and hydrogen for the wants of the animal consuming it, whilst in the atmosphere there exists an unlimited supply of oxygen. The nitrogen, to supply the materials of the muscular and albuminous tissues of the animal, and the phosphoric acid, and the earthy materials of the ash, requisite for the constitution of the animal's bones, are therefore, really the substances whose quantity determines the value of an article of food; and by determining these, it is hoped that the objects of the Flax Improvement Society, in having these analyses carried on, will be satisfactorily attained.

It is not necessary here to enter into any details of the modes of analyses employed. They would be interesting only to practical chemists, and would, in fact, lead to details and discussions far beyond the limits of a report like the present, as it was found indispensable, in the course of these analyses, to discuss the value of different processes proposed by eminent chemists, and to abandon some that had been hitherto believed to be trustworthy. This circumstance, which obliged me frequently to revise the experimental results, has been the cause of the delay in making this result.

A.—Seed-vessels of Flax Plant, including the Seed.

These seed vessels having been dried, at the temperature of boiling water, were incinerated. From 100 parts, there were obtained 8·80 of ash. It was found that 100 parts of this ash contained 4·41 of

phosphoric acid, and that hence the quantity of phosphoric acid in 100 of the seed capsules was 0·39.

It was found that 100 parts of these capsules, with seed, contained 1·80 per cent. of nitrogen.

B.—Husks, or Bran, of the Seed Capsules.

These husks having been dried at the temperature of boiling water, it was found that 100 parts gave, on incineration, 6·54 of ashes, and that 100 parts of this ash contained 5·74 of phosphoric acid. Hence, the quantity of phosphoric acid contained in 100 parts of the husks was 0·38.

It was found that 100 parts of the capsules, without seed contained 1·5 per cent. of nitrogen.

C.—Flax-Seed.

This seed, dried at 212 degrees, but without losing any oil, was found to give, from 100 parts, 5·18 of ash. The quantity of phosphoric acid derived from 100 parts of this ash was 9·05; whence it results that 100 parts of the flax-seed contain 0·47 of phosphoric acid.

100 parts of the seed were found to yield 1·81 per cent. of nitrogen.

D.—The Linseed-cake remaining after the expression of the Oil from the Seed.

After drying at the temperature of boiling water, this material yielded, from 100 parts, 8·67 per cent. of ash, and this ash gave, from 100 parts, 9·32 of phosphoric acid. The linseed-cake contained, therefore, in 100 parts, 0·81 of phosphoric acid.

From 100 parts of linseed-cake there were obtained 2·25 of nitrogen.

The above results may be usefully tabulated as follows :—

Substance Analysed.	Ashes per cent.	Phosphoric Acid per cent.	Nitrogen per cent.
Capsules, ...	8·80	0·39	1·80
Husks, ...	6·54	0·38	1·50
Seeds, ...	5·18	0·47	1·81
Cake, ...	8·67	0·81	2·25

To establish a comparison of the nutritive values of these bodies, it is first necessary to remark, that, according to the analyses of

Boussingault, whose correctness is worthy of great confidence, the nitrogen and phosphoric acid of wheat and oats, which we may take as standards, are as follow:—

In 100 parts, wheat contains 2·3 of nitrogen, and 1·13 of phosphoric acid, per cent.

Oats contain 2·2 of nitrogen, and 0·60 of phosphoric acid, per cent.

Now, representing the real nutritive powers of these varieties of food as being the result of the nitrogen and phosphoric acid conjoined—that is, of their product—and assuming the nutritive power of wheat as a standard—100— we find that we may express the

Nutritive power of	Wheat,	.. ..	100
,,	,,	Oats, ...	51
,,	,,	Flax, capsules with seeds, ...	27
,,	,,	Husks, ...	22
,,	,,	Flax-seed, ...	33
,,	,,	Linseed-cake, ...	70
,,	,,	Dry clover hay, ...	39

The precise nutritive value of the different substances yielded by the flax plant is thus seen; and it becomes evident that the capsules, or husks, may be used as food with very great advantage, although they are not equal to the other richer materials with which I have compared them.

It will be easily understood that the quantities of each kind of food, necessary to support the life of an animal, will be inversely proportional to the numbers assigned above, as expressing their nutritive powers.

(Signed,) Robert Kane.

In reference to the value of the capsules, chaff, or bolls of the flax plant, in the Third Annual Report of the Royal Society for the Promotion of the Growth of Flax in Ireland, Mr. Niven, of Chrome Hill, states that he had a cow which only gave two to three quarts of milk, but having fed her for some time on flax-bolls, she gave *nine* quarts of excellent milk. He, for the purpose of testing the real cause of the very marked improvement which had taken place, discontinued feeding upon bolls, and the consequence was that the quantity of milk given by her fell off so much that she only gave four quarts.

Composition of the Ash of Flax Shoves

The shoves, or refuse woody matters, which are separated in scutching flax, are at present employed in the steeping works as fuel. Dr. Hodges, in the course of the extended investigation of the flax plant, in which he is at present engaged, found that the ash which remains on the incineration of these matters, had the following composition, and might, therefore, advantageously be economised for use as manure. 100 parts of ash afford

Potash, ...	7·73
Soda, ...	5·91
Chloride of sodium, ...	1·78
Lime, ...	20·15
Magnesia, ...	5·46
Oxide of iron, ...	5·60
Sulphuric acid, ...	6·50
Phosphoric acid, ...	10·43
Carbonic acid, ...	20·10
Silica, ...	16·00
	99·66

1,000 lbs. of shoves yield, on combustion, 19½ lbs. of ash.

APPENDIX B.

Directions for the proper management of the Flax Crop, compiled by the Committee of the Royal Society for the promotion and improvement of the growth of Flax in Ireland.

The following directions have been carefully arranged from the mass of information obtained by the Society and their agriculturists, during their twelve years' experience in the improved system of management :—

Soil and Rotation.

By attention and careful cultivation, good flax may be grown on various soils ; but some are much better adapted for it than others. The best is a sound, dry, deep loam, with a clay subsoil. It is very desirable that the land should be properly drained and subsoiled ; as, when it is saturated with either underground or surface water, good flax cannot be expected. Without method, there cannot be success ; different soils re-

quire a difference of rotation. In the best soils of Flanders flax is grown in the third year of a seven-course rotation, or the fifth year of a ten course rotation. It is not to be considered generally advisable to grow flax more frequently than once in ten years ; not because it exhausts the land more than any other crops, but because good *flax* cannot be had at short intervals on the same soil.* In Belgium, it invariably follows a corn crop—generally oats ; and in this country, where oats is such a usual crop, the same system might be profitably pursued : but it must be understood, that it is only after oats following a green crop or old lea, and never after two or three succeeding crops of oats, which bad practice still prevails in some districts. It is a very general error among farmers, to consider it necessary that flax should follow a potato crop. Except on very poor soils, a better crop will be produced after grain, and the double profit of the grain and flax secured. If old lea be broken up, and potatoes planted, followed by a grain crop, a very fine crop of flax may be obtained in the ensuing year.

Preparation of the Soil.

One of the points of the greatest importance, in the culture of flax, is by thorough draining, and by careful and repeated cleansing of the land from weeds, to place it in the finest, deepest, and cleanest state. This will make room for the roots to penetrate, which they will often do to a depth equal to one-half the length of the stem above ground.

After wheat, one ploughing may be sufficient on light friable loam, but two are better; and, on stiff soils, three are advisable—one

* The following rotation, which would bring flax once in ten years, has been proposed :—First year, potatoes ; second, barley, laid down with grasses ; third year, cut for soiling ; fourth year, pasture ; fifth year, flax, or the one-half might be better in flax, the other in oats, so that, with the return of the rotation, which would be in five years, the flax could be put on the ground, which, in the last rotatory course, was under corn, throwing a range of ten years between the flax crops coming into the same ground.

A gentleman of much practical knowledge recommends the following as being the most profitable :—1. Oats after the grass and clover. 2. Flax pulled in August ; then ploughed and harrowed in with two cwt. guano and two cwt. gypsum ; then sown with rape. 3. Potatoes or turnips, well manured. 4. Wheat, sown in Spring, with clover and ryegrass. 5. Hay and clover. 6. Grazing. 7. Oats. 8. Flax and Winter vetches ; guano, as before mentioned. 9. Turnips, well manured. 10. Barley, sown with rye-grass and clover. 11. Clover and hay, 12. Grazing. 13. Oats.

immediately after harvest, across the ridges, and two in Spring, so as to be ready for sowing in the first or second week of April. Much will, of course, depend on the nature of the soil, and the knowledge and experience of the farmer. The land should be so drained and subsoiled that it can be sown in flats, which will give more even and much better crops. Subsoiling should not be done at a less interval than two years prior to the flax crop. This gives the land time to consolidate. But, until the system of thorough-draining be general, it will be necessary, after oats, to plough early in Autumn, to the depth of six or eight inches. Throw the land into ridges, that it may receive the frost and air; and make surface drains to carry off the rains of Winter. Plough again in Spring, three or four inches deep, so as to preserve the Winter surface for the roots of the flax. The Spring ploughing should be given some time before sowing, to allow any seeds of weeds in the lands to vegetate, and the harrowing in of the flaxseed will kill them, and save a great deal of after weeding. Following the last harrowing, it is necessary to roll, to give an even surface and consolidate the land, breaking this up again with a short-toothed or seed-harrow, before sowing, which should be up and down, not across the ridges or anglewise.

Sowing.

The seed best adapted for the generality of soils is Riga, although Dutch has been used, in many districts of country, for a series of years with perfect success. American seed does not generally suit well, as it is apt to produce a coarse, branchy stem. If used, it should be on deep, loamy, soils. In buying seed, select it plump, shining, and heavy, and of the best brands, from a respectable merchant. Sift it clear of all the seeds of weeds, which will save a great deal of after trouble, when the crop is growing. This may be done by fanners, and through a wire sieve, twelve bars to the inch. Home-saved seeds has produced such excellent crops, of late, that it is strongly recommended that every farmer should only sow each year as much foreign seed as would produce a sufficient quantity for his flax crop of the following season.* The thinner portion of the crop would be the best for this purpose, as when flax grows thin, it produces much seed. This plan, besides the saving effected in the price of foreign sowing seed, would effectually secure the farmer from any danger of loss from fraudulently made up seed. It will be best, in most cases, to use the seed which is saved

* The produce of seed averages about 12 bushels the statute acre, so that the seed saved off one statute acre would sow about five.

from this in the following year, for feeding, or to sell it for the oil mills, although it often produces good crops. The proportion of seed may be stated at three and a-half imperial bushels to the Irish or Plantation acre; and so on, in proportion to the Scotch or Cunningham, and the English or statute acre. It is better to sow too thick than too thin; as, with thick sowing, the stem grows tall and straight, with only one or two seed capsules at the top; and the fibre is found greatly superior, in fineness and length to that produced from thin-sown flax, which grows coarse, and branches out, producing much seed, but a very inferior quality of fibre. The ground being pulverized and well cleaned, roll and sow. If it has been laid off without ridges, it should be marked off in divisions, eight to ten feet broad, in order to give an equable supply of seed. After sowing, cover it with a seed harrow, going twice over it—once up and down, and once across or anglewise; as this makes it more equally spread, and avoids the small drills made by the teeth of the harrow. Finish with the roller, which will leave the seed covered about an inch—the proper depth. The ridges should be very little raised in the centre, when the ground is ready for the seed, otherwise the crop will not ripen evenly; and, when land is properly drained, there should be no ridges. The sowing of clover and grass seeds along with the flax, is not advised, when it can be conveniently avoided, as these plants always injure the root ends of the flax. But carrots may be sown in suitable soils, in drills, so that the person pulling the flax may step over the rows, which may be afterwards hoed and cleaned, and should have some liquid manure. A stolen crop of rape, or winter vetches, or of turnips of the stone or Norfolk globe varieties, may be taken after the flax is pulled. Rolling the ground after sowing is very advisable, care being taken not to roll when the ground is so wet that the earth adheres to the roller.

Manure for the Flax Crop.

Recent chemical investigations have shewn that the fibre of flax does abstract from the soil certain matters, although not in so large a proportion as several other commonly cultivated crops. To supply to the soil all the matters which the entire plant requires, so as to leave the land in the same state of fertility as before, the following compound has been proposed, by Professor Hodges, as a manure, which may be sown broadcast on the land, prior to the last harrowing before sowing the flax-seed:—

For a Statute Acre of Land.

		s.	*d.*
Muriate of Potash, 30 lbs., ...	cost about	3	0
Chloride of Sodium (Common Salt), 28 lbs., ..	"	0	3
Burned Gypsum, powdered, 24 lbs., ..	"	0	6
Bone dust, 54 lbs., ...	"	3	3
Sulphate of Magnesia (Epsom Salts), 56 lbs.,	"	4	0
		11	0

Weeding.

If care has been paid to cleaning the seed and the soil, few weeds will appear ; but if there be any, they must be carefully pulled. It is done in Belgium by women and children, who, with coarse cloths round their knees, creep along on all-fours. This injures the young plant less than walking over it (which, if done, should be by persons whose shoes are not filled with nails). They should work, also facing the wind, so that the plants laid flat by the pressure may be blown up again, or thus be assisted to regain their upright position. The tender plant, pressed one way, soon recovers ; but, if twisted or flattened by careless weeders, it seldom rises again.

Pulling.

The time when flax should be pulled is a point of much nicety to determine. The fibre is in the best state befor the seed is quite ripe. If pulled too soon, although the fibre is fine, the great waste in scutching and hackling renders it unprofitable ; and if pulled too late, the additional weight does not compensate for the coarseness of the fibre. It may be stated, that the best time for pulling is, when the seeds are beginning to change from a green to a pale brown colour, and the stalk to become yellow for about two-thirds of its height from the ground. When any of the crop is lying, and suffering from wet, it should be pulled as soon as possible, and kept by itself. So long as the ground is undrained, and imperfectly levelled before sowing, the flax will be found of different lengths. In such cases, pull each length separately, and steep in separate pools, or keep it separate in the same pool. Where there is much second growth, the flax should be caught by the puller just underneath the bolls, which will leave the short stalks behind. If the latter be few, it is best not to pull them at all, as the loss from mixture and discoloration by weeds would counterbalance the profit. If the ground has been thorough-drained, and laid out evenly, the flax will be all of the

same length. It is most essential to take time and care to keep the flax even, like a brush, at the root ends. This increases the value to the spinner, and, of course, to the grower, who will be amply repaid, by an additional price, for his extra trouble. Let the handfuls of pulled flax be laid across each other diagonally, to be ready for the

Rippling.

Which should be carried on at the same time, and in the same field, with the pulling. If the only advantage to be derived from rippling was the comparative ease with which rippled flax is handled, the practice ought always to be adopted ; but, besides this, the seed is a most valuable part of the crop, being worth, if sold for the oil mill, £3 per acre, and if used for feeding stock of all kinds, at least £4 per acre. The apparatus is very simple. The ripple consists of a row of iron teeth screwed into a block of wood. This can be procured in Belfast, or may be made by any handy blacksmith.* It is to be taken to the field, where the flax is being pulled, and screwed down to the centre of a nine-feet plank, resting on two stools. The ripplers may either stand or sit astride at opposite ends. They should be at such a distance from the comb, as to permit of their striking it properly and alternately. A winnowing sheet must be placed under them, to receive the bolls as they are rippled off; and then they are ready to receive the flax just pulled, the handsfull being placed diagonally, and bound up in a sheaf. The sheaf is laid down at the right hand of the rippler, and untied. He takes a handful with one hand, about six inches from the root, and a little nearer the top with the other. He spreads the top of the handful like a fan, draws the one-half of it through the comb, and the other half past the side ; and by a half-turn of the wrist, the same operation is repeated with the rest of the bunch. Some, however, prefer rippling without turning the hand, giving the flax one or two pulls through, according to the quantity of bolls. The flax can often be rippled, without being passed more than one through the comb. He then lays the handsfull down at his left side, *each handful* crossing the other, when the sheaf shall be carefully tied up and removed. The object of crossing the handsfull so carefully, after rippling, when tying up the beets for the steep, is, that they will part freely from

* The best ripples are made of half-inch square rods of iron, placed with the angles of iron next the ripplers, 3-16ths of an inch asunder at the bottom, half-an-inch at the top, and 18 inches long, to allow a sufficient spring, and save much breaking of flax. The points should begin to taper 3 inches from the top.

each other, when they are taken to spread out on the grass, and not interlock, and be put out of their even order, as would otherwise be the case. If the weather be dry, the bolls should be kept in the field, spread on winnow-cloths, or other contrivance for drying; and, if turned from time to time, they will win. Passing the bolls first through a coarse riddle, and afterwards through fanners, to remove straws and leaves, will facilitate the drying. If the weather be moist, they should be taken in-doors, and spread out thinly and evenly on a barn floor, or on a loft, leaving windows and doors open, to allow a thorough current of air, and turned twice a-day. When nearly dry, they may be taken to a corn kiln (taking care not to raise it above summer heat), and carefully turned until no moisture remains. By the above plan of *slow* drying, the seed has time to imbibe all the juices that remain in the husk, and to become perfectly ripe. If it be taken at once from the field, and dried *hurriedly* on the kiln, these juices will be burned up, and the seed will become shrivelled and parched, little nutritious matter remaining. In fine seasons, the bolls should always be dried in the open air, the seed thrashed out, and the heaviest and plumpest used for sowing or crushing. The light seeds and chaff form most wholesome and nutritious feeding for cattle. Flax ought not to be allowed to stand in the field, if possible even the second day; it should be rippled as soon as pulled, and carried to the water as soon as possible, that it may not harden.

Watering.

This process requires the greatest care and attention. River water is the best. If spring water has to be used, let the pond be filled some weeks, or months, if possible, before the flax is put in, that the sun and air may soften the water. That containing iron or other mineral substances should never be used. If river water can be had, it need not be let into the pond sooner than the day before the flax is to be steeped. The best size of a steep-pool is 12 to 18 feet broad, and 3¼ to 4 feet deep. Place the flax loosely in the pool, in one layer, somewhat sloped, and in regular rows, with the root end underneath; the tie of each row of sheaves to reach the roots of the previous one; cover with moss sods, or tough old lea sods, cut thin, laid perfectly close, the sheer of each fitted to the other. Before putting on the sods, a layer of rushes or ragweeds is recommended to be placed on the flax, especially in new ponds. As sods are not always at hand, a light covering of straw may do, with stones laid on it, so as to keep the flax just under the water; and as the fermentation proceeds, additional weight should be laid on—to be removed as soon as the fermentation ceases, so as not to sink the flax too

much in the pool. Thus covered, it never sinks to the bottom, nor is affected by air or light. A small stream of water, allowed to run through a pool has been found to improve its colour. In this case, if the pools are in a line, the stream should be conducted along the one side, and run into each pool separately, and the water of each pool run off, along the opposite side, in a similar manner. It will be sufficiently steeped, in an average time, from eight to fourteen days, according to the heat of the weather, and the nature of the water. Every grower should learn to know when the flax has had enough of the water, as a few hours too much may injure it. It is, however, much more frequently *under*-watered than *over*-watered. The best test is the following:—Try some stalks, of average thickness, by breaking the *shove*, or woody part, in two places, about six or eight inches apart, at the middle of the stalk; catch the broken bit of wood, and if it *will pull freely out, downwards, for that length, without breaking or tearing the fibre, and with none of the fibre adhering to it*, it is ready to take out. Make this trial every six hours, after fermentation subsides, for sometimes the change is rapid. Never lift the flax roughly from the pool, with forks or grapes, but have it carefully handed out of the flax drain by men standing in the water. It is advantageous to let the flax drain twelve to twenty-four hours, after being taken from the pool, by placing the bundles on their root ends, close together, or on the flat, with the slope; but the heaps should not be too large, otherwise the flax will be injured by heating.

There are two new systems of steeping or retting flax, on a large scale, now in operation. The one is by hot water, or what is called Schenck's method; and the other by steam, or Watt's method. In both cases they are carried on, on a large scale, by persons who purchase the flax straw from the farmers, as pulled and dried on the Courtrai system. Both plans are protected by patents, and authorisation to adopt them must be had of the patentees.*

Spreading.

Select, when possible, clean, short, thick pasture ground for this operation; and mow down and remove any weeds that rise above the surface of the sward. Lay the flax evenly on the grass, and spread thin and very equally. If the directions under the head of rippling have been attended to, the handsfull will come readily asunder, without

* By addressing a communication to Messrs. Bernard & Koch, Cregagh Flax Works, Belfast, terms for Schenck's system may be ascertained, with full particulars of the apparatus required.

entangling. Turn it two or three times while on the grass (with a rod about eight feet in length, and an inch and a-half in diameter), that it may not become of different shades, by the unequal action of the sun, which is often the case, through inattention to this point. Turn it when there is a prospect of rain, that the flax may be beaten down a little, and thus prevented from being blown away.

Lifting.

Six to eight days, if the weather be showery, or ten to twelve if it be dry, should be sufficient on the grass. A good test of its being ready to lift, is to rub a few stalks from the top to the bottom; and, when the wood breaks easily, and separates from the fibre, leaving it sound, it has had enough of the grass. Also, when a large proportion of the stalks are perceived to form a *bow and string*, from the fibre contracting and separating from the woody stalk. But, the most certain way is, to prove a small quantity with the handbreak, or in a flax mill. In lifting, keep the lengths straight and the ends even, otherwise great loss will occur in the rolling and scutching, Let it be set up to dry for a few hours, and afterwards tie it up in small bundles; and, if not taken soon to be scutched, it will be much improved by being put up in small stacks, loosely built, with stones or brambles in the bottom, to keep it dry, and allow free circulation of air. Stacks built on pillars would be the best.

Drying

By fire is *always most pernicious.* If properly steeped and grassed, no such drying is necessary; but, to make it ready for breaking and scutching, exposure to the sun is sufficient. In some districts, it is put to dry *on kilns*, in a damp state, and is absolutely burned before it is dry, and the rich oily appearance of the flax is always greatly impaired. On this point, the Society can scarcely speak too strongly, as the flax is either destroyed, or rendered not worth one-half of what it would be if properly dried.

Breaking and Scutching,

If done by hand, should be on the Belgian system, which is less wasteful than that practised in Ireland. If by milling, the farmer will do well to select those mills in which the improved machinery has been introduced. The Society would also recommend that the farmer should endeavour to have his flax scutched by a mill-owner who pays his men by the day, and not by the stone, even if it should cost him higher in proportion; the system of paying the scutchers by the stone rendering them more anxious to do a large quantity in the day than to produce a good yield from the straw.

The Courtrai System.

This is the mode in which flax should be saved for steeping on Schenck's or Watt's patent systems. It requires to be very carefully done, as inattention will reduce the value of the straw, and yield inferior fibre. When made up, for drying, in large sheaves, the straw is much injured, the outside stalks being much discoloured by the heat of the sun, before the inside of the sheaf is dry. The flax stems should be put together in bunches, about one-half larger than a man can grasp in one hand, spread a little, and laid on the ground in rows after each puller; the bunches laid with tops and roots alternately, which prevents the seed-bolls from sticking to each other in lifting. It should be stooked as soon after pulling as possible, and never allowed to remain over night unstooked, except in settled weather. The stooking should go on at the same time as the pulling, as, if flax is allowed to get rain while on the ground, its colour is injured. A well-trained stooker will put up the produce of a statute acre, or more, in good order, in a day, with two boys or girls to hand him the bunches. The flax should be handed with the tops to the stooker. The handsfull, as pulled, are, set up, resting against each other—the root ends spread well out, and the tops joining like the letter A. The stooks are made eight to ten feet long, and a short strap keeps the ends firm. The stooks should be very narrow on the top, and thinly put up, so that they may get the full benefit of the weather. In six or eight days, at most, after being pulled, the flax should be ready for tying up in sheaves of the size of corn sheaves. It is then ricked, and allowed to stand in the field until the seed is dry enough for stacking. To build the rick, lay two poles parallel on the ground, about a foot asunder, with a strong upright pole at each end. The flax is then built, the length of a sheaf in thickness or breadth. The bottom poles should be laid North and South, so that the sun shall get at both sides of the rick during the day. In building, the sheaves should be laid tops and roots alternately, built seven to eight feet high, and finished on the top by laying a single row of sheaves lengthwise, or across the others, and then another row as before, but with the tops all the same way, which gives a slope to throw off rain, and finished by putting on the top a little straw, tied with a rope. In this way, if properly built, it will stand secure for months. It can be stacked at leisure, or put in a barn, the seed taken off during the winter, and the flax steeped in the following May; or it may be kept stacked, without receiving any injury for two or three years, or even longer.

APPENDIX C.

British Association's Meeting at Belfast. Dr. Hodges' Lecture on the Flax Plant.

THE following extracts embody the most novel points brought forward by Professor Hodges, in his paper read before the British Association, at Belfast, 23rd September, 1852:

The composition of the Flax Plant.

I conceive that the most satisfactory method will be to communicate the history of a crop grown by myself for experimental purposes, and the progress of which I was able carefully to watch, from the sowing of the seed to its conversion into dressed flax for the market. Some of the details which I have collected, though of much importance in the study of agricultural science, have not been hitherto much attended to in this country. The field selected for the experiments was situated about a mile and a-half from Belfast. It has a S.W. aspect, and the soil is composed of transported materials, such as are common in the districts surrounding Belfast.

July 28.—One plant of flax, in seed, was taken—height above ground 31 inches, root, 5½ in. long; length from surface of field to first branch, 24 inches. About 5 inches of the lower end of stem had become yellow. The weight of entire plant was 71.1 grains. It was cut into three portions, which were separately incinerated, with the following results:—

1. Root and lower part of stem weighed, dried, 6.60 grains, gave 0.094 ash, 1.424 per cent.

2. Capsules and branches, dry, weighed 9.47, gave .293 ash, 3.094 per cent.

3. Middle portion, dry, weighed 5.55 gave .143 ash. Ash in dry stem, 2.622 per cent.

August 10*th*.—One plant taken—entire length with root, 37 inches; length from surface of soil to branches, 29 inches; stem of a light straw colour; leaves withered on 10 inches of stem; capsules 10 in number—seeds green; weight of entire plant, 71 grains; branches and capsules, 31.8 grains; water in plant, 45.335 grains; solid matter in do., 25.665 grains; inorganic matter in do., 1.006 grains.

Per centage Composition.

Water, ...	63.852	dry.
Organic matters, ...	34.732	96.08
Ash, ...	1.416	3.92
Total, ...	100.000	100.000

August 25.—The pulling of the crop was begun—a plant was taken and examined; weight of entire plant, 62.40 grains; weight of capsules 22.50.

Per centage Composition of Stem.

	In Fresh Plant	*Dry.*
Water, ...	56.64	..
Organic matters, ...	41.97	96.89
Ash, ...	1.39	3.11
Total, ...	100.00	100.00

Water in straw of plants as sent to the steeping works, after 14 days' exposure to the air, in stooks, 12.2 per cent; water in air-dried capsules, 11.84 per cent; weight of the air-dried flax, with bolls produced on the experimental field, 7,770 lbs.

Composition of the Crop.

100 parts of the ash of the dry straw and capsules had respectively the following composition:—

	Ash of Straw.	*Of Capsules.*
Potash, ...	20.32	16.38
Soda, ...	2.07	6.25
Chloride of sodium, ...	9.27	12.98
Lime, ...	19.88	13.95
Magnesia, ...	4.05	3.91
Oxide of iron, ...	2.83	0.38
Sulphuric acid, ...	7.13	14.51
Phosphoric acid, ...	10.24	23.26
Carbonic acid, ...	10.72	6.37
Silica, ...	12.80	0.67
Total, ...	99.31	99.66

Amount of Nitrogen contained in the Straw and Capsules.

The proportions of nitrogen contained in the straw and capsules were ascertained by the method of Well and Vanentrap, calculated from the bi-chloride of ammonia and platinum. The results were as follow, per cent.:—

1. In the straw dried at 212°, ... 0.53 nitrogen.
2. In the capsules or bolls do., ... 1.26 do.,

One of the earliest among those who directed their attention to the chemical composition of flax, was a distinguished member of this Association, Sir Robert Kane. Since that time analysis of the ash of straw

of flax have been published by Professor Johnston, of Durham; Messrs. Mayer, and Brazier, and by Mr. Way, in England; by Lench Tweiss, in Germany; and by the Reporter. The only examination of the proximate constituents of the plant, so far as I am aware, consists of an analysis of the seed by Leo Mayer. It is indeed strange that a plant, the straw of which has afforded occupation to the industry of so large a portion of the world in all ages, and the preparation of which, for commercial purposes, consists in acting upon its proximate constituents, should not have been more carefully investigated. Having been for some time engaged with investigations for the Royal Flax Society in this important department, I shall, on some other occasion, bring before you the details of my analysis. At present I shall merely state the general results of the examination of a specimen of flax straw taken from the experimental crop. A preliminary examination of the straw having indicated the presence of a volatile oil, a quantity of the stems of the plant carefully deprived of the seed capsules was distilled with water containing common salt, and from the distillate, which was without action on litmus, I obtained an oil of a yellow colour; 5lbs. of the stems afforded about ten grains of this oil, which had an agreeable penetrating odour, and the distillate of the stems suggested the peculiar smell which is remarked on entering a room where flax is stored. The straw, coarsely powdered, was placed in an extraction apparatus, and successively treated with ether, absolute alcohol, water, dilute hydro-chloric acid, and weak solution of potash. The solutions obtained on examination were found to contain wax, traces of chlorophyle, a peculiar green resin, a bright brown gum resin, which presented some of the characters of the principle which Pagenstecher termed linen, and described as existing in the *Linum catharticum*, or "purging flax," but could not be identified with it, a modification of tannic acid, which afforded a grey precipitate with perchloride of iron, but was not affected by solutions of isinglass or tartar emetic gum, not affected by solution of borax or basic sillicate of potash, a brown colouring matter, albumen, casein, starch, pectin, cellulose, and salts. The following table exhibits the action of the various solutions employed:—

1. Soluble in ether,	2.83
2. Soluble in absolute alcohol,	3.52
3. Soluble in water,	5.92
4. In dilute hydro-chloric acid,	22.76
5. In dilute caustic potash,	16.39
6. Cellulose and salts,	48.58
	100.00

I shall now proceed to the fourth division of the subject, and describe the various methods which are adopted for the purpose of preparing the flax plant for the spinner. I shall not, in this place, allude to the economy of its seed, but confine myself to the management of the fibre of the plant, to obtain which, of superior quality, is the main object of the flax-growers of Ulster. When a portion of the straw, as it is termed, of the flax plant is examined, it is found to consist of three parts; first, of a woody central hollow column, which the microscope shews to be composed of cellular tissue; second, of a tubular sheath, composed of long and firm bast cells; and thirdly, of a delicate covering of epidermis. By rubbing a piece of dried flax straw between the fingers, the woody central part and delicate epidermis can be readily broken to pieces, while the tough fibres of the bast cell will be found to remain but little injured. Those tough fibres, which are capable of being split into filaments of extreme delicacy, constitute the raw material of our greatest national manufacture.

From the earliest times only one method has been found capable of yielding the textile material in a condition adapted for every purpose, and possessing all the qualities demanded by the spinner, viz., the decomposition by the process of fermentation of the adhesive substances which connect together the bast fibres and the ligneous tissues of the straw. It is by this process, variously modified in the arrangements for conducting it, that nearly all the fibre produced in the great flax-growing countries of Europe is at present prepared. In many parts of Germany the fermentation is induced by exposing the flax, spread in the fields, to the influence of the air and moisture; while in Belgium, which is justly regarded as the model country of flax management, the practice of enclosing the straw in wooden frames, and immersing it in the waters of rivers until the necessary changes are produced, is, in many places, adopted and found to yield fibre of superior quality.

In Ireland, at the present time, two modifications of the system of fermentation are in use—one of which consists in steeping the straw in pools of water in the open air at ordinary temperatures, while according to the other method, the steeping is transferred from the farm to the factory, and the fermentation accelerated by employing water maintained at an elevated temperature. The former method of steeping has prevailed in this country and in other parts of Europe to some extent from the earliest times; and though it has been asserted by some writers, without, however, any authority for the statement, that the ancient inhabitants of this island prepared the flax in the same rude manner, by

beating the unsteeped straw, as observed among some of the people of the South Sea Islands, yet we may, I think, infer from the number of places to which the name "*poll-a-lin*," *i. e.* flax-hole, is applied, that they steeped it in water. The plan followed by the farmer, who adopts the plan of steeping the flax on his farm in the open air, is to excavate a pond in connexion with some convenient stream. The dimensions preferred are from twelve to eighteen feet broad, and about four feet deep. The quality of the water employed requires careful consideration —hard waters being found materially to interfere with the process; ferruginous waters also are avoided; and in those districts where the steeper is obliged to make use of them, the flax acquires a dark tinge, which the bleacher finds it difficult to remove. From the action of the salts of iron upon the modification of tannic acid, which I have shewn to exist in the straw, we can readily understand that the presence of iron in the water of the steep-hole, must be prejudicial. As the oozing of water from the adjoining soil also frequently produces discoloration of the flax, careful steepers place on each side of the pond a small drain to prevent the entrance of drainage waters. The flax after pulling, is prepared for steeping by removing the seed capsules, or bolls, by means of a simple machine, composed of a number of iron teeth, about eighteen inches long, screwed to a socket of wood, and fixed perpendicularly on a long bench, upon which the workmen sit. The bolls are separated from the stems by the workmen taking a handful of the flax, spreading it out, and drawing it through the teeth of the ripple, as the machine is termed. Sometimes, however, the steeping does not take place until the flax has been stored for some time, and has become so dry that the fibre would be liable to injury by using the common rippling machine. In such cases the seed is beaten off by means of a beater, formed of a block of wood furnished with a curved handle.

During the steeping, the water acquires a dark brown colour, carbonic acid is disengaged in great abundance, and the surface becomes covered with a gelatinous scum. To remove this matter, it is usual to allow a gentle current of water to flow over the surface of the pond from the supplying stream, as, when it is allowed to remain, the colour of the flax is found to be injured.—Various methods are resorted to in this, and other flax-growing countries, to ascertain the proper period for the removal of the flax from the pond. Thus, the Silesian steepers take some stalks of the flax from the pits, and place them on the surface of the water. If the stalks sink, they remove the flax, but if they swim they allow the steeping to continue for some days longer; while the

Irish farmer, day after day, when the fermentation has fairly commenced, anxiously tests the progress of decomposition, by drawing a few stalks from one of the flax bundles, and breaking them across in two places, about three inches apart. If he can readily pull away the central woody column, without tearing the filaments of bast which surround it, he considers that the period has arrived for removing it from the pit.

It is easy to perceive that the peculiar series of changes which facilitate the breaking up of the various organic compounds which compose the structure of the flax plant, must, in our fickle climate, where so many sudden alternations of temperature occur, be liable to frequent disturbance, and that the progress of the fermentation, in the shallow steeping-pools, must be exceedingly irregular and uncertain. It is not, indeed, to be wondered that, notwithstanding the closest supervision, the most experienced steepers should frequently be deceived, and that one part of the flax should be too much decomposed, while another part has not properly experienced the alterations which facilitate the complete separation of the valuable material.

Produce of Fibre, &c.

The amount of rippled flax straw, viz., 5,824 lbs., ascertained in my experiment, considerably exceeded the ordinary produce of the farmer. From the returns of the Royal Flax Society, and from my own inquiries, I would estimate the average produce of a statute acre in the North of Ireland of air-dried flax straw, with bolls, at two tons, which, by the seeding machine, are usually reduced to 3,360 lbs. By the various processes of the rural manufacturer, the amount of dressed flax or fibre obtained averages from four to five cwt. per acre. Some time ago, I made an experiment at one of the country scutch-mills near Belfast, for the purpose of ascertaining the relative proportions of the various products, and also the distribution of the inorganic matters. The flax employed had been steeped in the usual way, and was found to contain 173 per cent. of inorganic matters :—

4,000lbs. of air-dried straw produced of,

Dressed flax, ...	500 lbs.
Fine tow, ...	132
Coarse tow, ...	192
	824 lbs.

The material used contained

In the flax, ...	4.48 lbs. of inorganic matters.
In the fine tow,..	2.08
In the coarse tow, ...	2.56, or in all 9.12 lbs.

So that 59.08 lbs. of the inorganic matters, which the crop had withdrawn from the field, remained locked up in the woody shoves, which, as obstinately resisting decomposition, are used for fuel, while 9.12 lbs. were carried away in the dressed flax and tow sold to the spinner.

When the crop had been completely air-dried, by exposure in the field, so as to yield as already stated, in the straw, when dried at 212 degs., only twelve per cent. of water, it was removed to the steeping works at Cregagh. It was there placed in stacks, and after some time prepared for steeping. The first operation for this purpose is the removal of the valuable bolls or capsules. This, in these establishments, where the cost of labour is carefully considered, is usually most expeditiously and perfectly effected, by means of a machine composed of two cast iron rollers, to which motion is communicated by a belt from the steam-engine. Between these the flax is passed and the capsules bruised, so that the seed can be readily shaken out. Having been deprived of its bolls, by this machine, it was found that the 7,770 lbs. of flax were reduced to 52 cwt., or 5,824 lbs.

Of the portions of the plant removed by the seeding machine, 910 lbs. consisted of clean seed, 1036 lbs. of husks, leaves, and sand. The loss experienced by the flax in steeping was 13 cwt. From the 52 cwt. of seeded straw, the produce of the experimental crop, there remained 6 cwt. 1 qr. 2 lbs. of marketable fibre.

The taste of the steep-water, at first, is rather agreeably acid, but followed by the peculiar plant-like taste of the flax. By the addition to the liquid of carbonate of lime, its acidity is destroyed. Contrary to what has been stated in some reports on this subject, the liquid, I found, at the conclusion of the process, yields merely a trace of acetic acid, and, in numerous experiments, no trace of the evolution of sulphuretted hydrogen could be detected at any stage of the fermentation. When the flax is allowed to remain in the vats after the usual time, a new series of changes, and a fresh and rapid extrication of gas, take place. I have made, during the last three years, numerous experiments, with respect to the composition of the steep-water from several establishments, and, also, from the common steep-pools, which afforded me some interesting results, and satisfied me that the fermentation which is induced by steeping flax in water resembles the so-called butyric acid

fermentation, merely traces of acetic acid, and invariably large quantities of byturic acid having been detected in every case. In fact, the fragrant butyric ether, so extensively employed in the preparation of pine-apple rum, and in flavouring confectionery, might readily be obtained, in large quantities, from the stinking waters of the flax pool.

To ascertain exactly the effect produced by steeping, and the composition of the steep-water, I obtained from the works at Cregagh, a sample of flax straw unsteeped, a portion, of steeped straw taken from the same lot, and a gallon of the steep-water taken from the vat immediately after the removal of the flax. The composition of the ash obtained by burning the extract of the steep-water, and the samples of the straw, is given in the table. The spring water employed at the works, is moderately hard, indicating, on Dr. Clarke's scale, 8 degrees. It was not considered necessary to deduct the ingredients supplied in it, as these would add but little to its fertiliizng value. An imperial gallon of the liquid of the vat was found to contain in grains and tenths :—

Organic matters, ...	136.7
Inorganic matters, ...	131.4
Total solid matters, ..	268.1 grains.

Composition of the Ash of the Flax Straw before and after Steeping, and of the inorganic matters of the Steep Water.

100 parts of each respectively contained,

	Unsteeped Flax.	Steeped Flax.	Ash of the Steep Water.
Potash, ...	13.88	11.40	19.31
Soda, ...	5.33	4.17	.....
Chloride of Potassium, . .	.....	.....	3.83
Chloride of Sodium, ...	6.47	3.28	21.24
Lime, ...	18.86	17.69	8.23
Magnesia,..	4.10	5.50	10.18
Oxide of Iron, ...	5.40	5.76	2.02
Sulphuric Acid, ...	11.16	4.07	6.10
Phosphoric Acid, ...	9.63	11.87	3.77
Carbonic Acid, ...	10.37	20.006	23.30
Silica, ...	15.23	15.78	1.12
Sand, ...	....	....	0.60
	100.43	99.58	99.77

Ash per cent. in the Straw, ... 3.89 2.59

100 grains of the dried extract of the steep water contained 1.56 nitrogen,=1.89 grains of ammonia: therefore, an imperial gallon would be capable of supplying 5 grains, and a vat, containing 3,000 gallons of water, 21-10lbs., worth about 1*s.* 2*d.* to the farmer: while the same amount of liquid placed on his field would convey to them about the same amount of phosphoric acid.

By the kindness of the proprietors of the steeping works at Cregagh, who have liberally given me an opportunity of inspecting the books of their establishment, I am enabled to give the following statement of the changes which 100 tons of flax undergo when treated by Schenck's process.

100 tons of air-dried Flax Straw yield:—

	Tons.
1. *By Seeding*—33 tons of seed and husks, leaving of seeded flax,..	67
2. *By Steeping*—67 tons of seeded flax yield of steeped straw, ..	39.5
3. *By Scutching*—39½ tons of steeped straw yield of dressed flax,..	5.90
„ of tow and pluckings, ...	1.47

APPENDIX D.

MacBride's Patent Self-Acting Scutching Machine, MacAdam Brothers and Co., Belfast, Makers. The makers having perfected the details of the Machine, can recommend it with confidence.

For a long time past the want has been felt, in all flax-growing districts, of a machine capable of scutching the Flax straw without the assistance of skilled hands. Not only is the expense of employing trained workmen for this purpose a serious item in the preparation of Flax, but latterly even these have become scarce, owing to great demand, and to other causes. Besides, the rapid extension of the new systems of steeping Flax on a large scale in Factories or Retteries, renders more important than ever the introduction of a self-acting machine, capable of doing a large quantity of work, independent of workmen. Various attempts have been made, from time to time, to produce such a machine, but until now, none have been found to answer.

MacAdam Brothers & Co., Belfast, have the gratification of announcing that they are at length able to supply a scutching machine which accomplishes all the objects required.

1. It is perfectly *self-acting*, merely requiring the Flax straw to be put in at one side, and the finished Flax taken out at the other. From the moment the Flax enters the machine no further attention is necessary ; the machine does all, and delivers it out perfectly scutched.

2. *No skilled workmen* are required ; the only attendance necessary being one person to put in the Flax, another to take it out, and some children to hand the Flax to and from these persons All clasps or holders for fastening the Flax are dispensed with, so that the work is of the simplest possible kind.

3. The *cost* of scutching is thus diminished largely, the attendants being all of the class of ordinary labourers.

4. The Machine will do a large quantity of work in the day—namely from 50 to 60 stone (of 16 lbs. each) of scutched Flax in twelve hours, according to the quality of the Flax ; —that is about two and a half tons of straw.

5. It is adapted for *all kinds* of Flax straw, whether cold or hot steeped, hard or soft ; and a simple provision is made by which the action of the machine can be altered to suit the different qualities.

6. It scutches the Flax with perfect *safety* to the fibre, leaving the "reed" whole from end to end.

7. For this last reason it is evident that the "*yield*" of fibre, from a given quantity of Flax straw, must be greater than in any of the ordinary modes of scutching ; and such is found to be the fact. Hardly any "tow" is produced by the Machine.

8. The *power* required for driving the Machine is four-horse, or about *half* the power required for an ordinary scutching-mill capable of doing the same quantity of work.

This Machine has been the result of years of patient experiments on the part of the inventor ; and, although quite novel as far as regards many of the arrangements, is founded on the well-tried principle of the Irish scutching-handle, but applied in a new form. To many persons this would at once be a sufficient recommendation.

Further information may be obtained, on application, from the makers.

MacAdam Brothers & Co., *Soho Foundry, Belfast.*

APPENDIX E.

Roan Spinning Mills, Dungannon, 24th, Nov. 1853.

DEAR SIR,—In compliance with your letter of the 19th instant, I went to see Mr. MacBride's scutching machine at work in the Messrs. McClelland's scutch mills, Dungannon, and to say the least of it, I was more than astonished with its performance. In my opinion, it is the only machine you might call a perfectly self-acting machine. When I was present, there was 28 pounds of flax straw put into the machine, which produced 5 pounds of well scutched flax.

(Signed) JOHN STEVENSON.

APPENDIX F.

The following pages are explanatory of Schenck's Patent System, and will afford ample and practical information on the subject:—

Site of a Rettery.

In the selection of a site for a rettery, the following requisites, which are all of importance, must be kept in view. They are—An open space of four to eight statute acres, according to the proposed size of the establishment, accessible by good roads, and unsheltered by either hills or plantations, to ensure quick drying. A constant supply of pure, soft water, for retting, having, if possible, a fall of six feet, by which pumping is avoided.

A good outlet for the waste water.

The vicinity of a village, or of cottages, from which a sufficient number of hands can be obtained.

If the machinery is to be driven by water-power, it is absolutely necessary that the supply of water be never-failing. Great inconvenience and serious loss would be caused by a partial stoppage of the work, during the best season; it would then be found necessary to erect a steam-engine, which would cause an additional outlay.

Buildings of a Rettery.

The manner of laying out the buildings of a rettery must vary according to local circumstances, but there are some general principles which

must, in all cases, be kept in view. Economy of labour is aimed at in all manufacturing establishments, and in a rettery this point is of paramount importance. Flax is very bulky, and has to undergo so many manipulations, in its dry and wet state, that the arrangements must be such as to save all unnecessary handling, carrying, and labour of any kind. For this purpose, the different operations must be carried on in distinct places, contiguous to each other, and, in order to avoid any confusion, they should follow each other in an onward direction. Ample space must be given in each department, want of room being of great disadvantage.

The annexed plan of a model rettery conveys an idea of such arrangements, combining the principal requisites for commodity and cheapness of labour. It will be seen that the flax moves on regularly in the same direction, from the seeding room, to the retting room, thence to the spreading-room, the drying sheds, &c.

The plan shews the buildings to consist of

The seeding room with loft above.

The vat-house and spreading-room.

The drying sheds.

The desiccating house.

The store-sheds.

The scutching mill, and engine or water-wheel house.

The seeding room must be of large size, so as to allow ample room for the manipulation, and to contain a stock of flax. For the greater facility of bringing the flax in, it should be on the ground floor, be lofty enough, and have doors sufficiently large to admit loaded carts or trucks. It should be so situated that a shaft can be brought in, and driven from the main power, and so that it be in communication with the vat house. The loft is used for cleaning amd storing the seed, and for various other purposes, it should have a good, strong floor.

The vat house and spreading room consists of a ground floor only. They can be built together with a valley roof, resting on pillars. The portion of roof over the vats should have louvers to give ventilation, and to allow the free escape of the vapours which arise from the vats. Asphalte makes a good floor for the spreading room. All the doors should be at least six feet wide. Hooped, wooden vats, oval shape, have been found to answer best; they resist the pressure caused during the fermentation, and are not liable to frequent leakage; they are also handy to work, and can be easily repaired. Wooden, square vats, however strongly made, do not keep stanch for a long time.

The drying sheds are to be erected on an open space, well exposed to the winds, and not far distant from the spreading room. They must be placed at right angles with the prevailing wind, and at fifty or sixty feet distance from each other.

The desiccating house is divided into two separate rooms, each to contain the flax of one day's work. A fire-proof construction is to be preferred.

The store-sheds are necessary for housing the dried flax previous to its being scutched. They should be erected near the scutching mill, and made so as to allow carts to go under.

The scutching mill must be immediately adjoining to the power, whether steam or water; it must be dry, and well lighted, and built of sufficient dimensions to contain, besides the machinery, a stock of flax straw, and to give plenty of room to the workers.

The stack yard should be situated as near as possible to the main works, and facing the seeding house.

Work performed in a Rettery.

Seeding.—This is done by a machine made expressly for the purpose, and acting by means of rollers, between which the seed end of the flax is passed sideways, two or three times, the capsules or bolls are crushed, and the seed falls out uninjured, the flax straw being neither crushed nor put out of shape. After the beets have passed through the machine, they are lashed, to shake out the loose seed and the broken bolls. As the flax requires to be in a dry state for that operation, a stock equal to several days' work should always be kept in the seeding house. This stock to be renewed whenever the state of the weather permits.

The seed and bolls are then passed through a dressing machine fitted with the proper sieves. Seed intended for sowing should receive a double cleaning, to remove all light pickle. The clean seed should be kept on a well ventilated loft, and be allowed to remain some time exposed to the air, receiving occasional turnings before it is put into bags —barrels are better.

The bolls or chaff are excellent food for cattle, when steamed and mixed with turnips.

Several other methods of seeding have been resorted to, but they are all open to objections. Thrashing machines cause a great waste, and damage the ends of the flax, and part of the seed is left in the centre of the beet. Rippling requires a large space, and numerous hands—is too slow and expensive; besides, in this case, as with the thrashing machine,

the bolls have to be crushed afterwards. Beating the seed off by hand is less objectionable, but it is only applicable on a smaller scale.

Sorting.—This work must be done very carefully, and requires experienced hands. The sorters have to separate the different qualities, according to colour and length, forming new beets containing but one quality. They pass these new beets to the binders, who tie them singly, as handed to them, keeping the roots square ;—rush bands are preferable. It is a good plan to cut off the roots by a machine like a chaff-cutter, as it facilitates the after-handling ; the beets are now selected and piled up according to quality. The object of sorting is, to have every vat filled with the same description of flax, which ensures a more uniform retting and more even quality. The flax is now ready to go into the vats.

Retting.—In order to have in every vat as nearly as possible the same relative proportions of flax and water, it is well to weigh the flax before putting it into the vat ; the beets must be placed carefully upright, the roots resting on the false bottom, and pressed slightly together by the workman as he goes on filling, care being taken that all be straight to facilitate a free upwards circulation of the heated water and of the gases. When the vat is filled with flax, the covers are put on and secured by cross-bars, so as to keep the flax 4 or 5 inches immersed in the water. The vats are then filled up with cold water, and enough steam is turned on to raise the heat to 90 deg. in about eight hours ; the temperature of the water is not to exceed at any time 90 deg., but must be kept uniformly at that degree, day and night, during the whole retting process ; this is easily effected by letting in steam whenever the temperature begins to fall. The flax must not be left any length of time in the cold water, as it would retard the fermentation ; therefore, the vats must not be filled with cold water long before the time the steam is to be put on.

The number of hours for the retting are to be reckoned from the time the steam is turned on at first. The duration of the process averages about sixty-six hours, but will vary according to circumstances such as the following:—

The quality of the water.—That which is soft and more suitable for fermenting purposes will produce a more active and quicker retting.

The description of flax.—Good, sound, well matured and well saved flax requires more retting than unripe, green-pulled, or otherwise damaged flax.

Quality aimed at.—If the object is to bring the fibre to great fineness, the retting must be carried on longer than for obtaining a stronger but coarser article.

In some cases a temperature of 80 and 85 deg. may be advantageously used, but the retting will then require a longer time than with the water at 90 deg.

One of the best tests for ascertaining when flax is properly retted, is to take a few stalks of average fineness, which are broken in two places about three inches apart; if the wood so broken, separates easily on being drawn downwards, without tearing the fibre or retaining any part of it, the flax is sufficiently retted, and the water may be run off.

It may answer in some cases to give two successive rettings to the same flax; strong hearty flax will be improved by this double operation, but, of course, it increases the expense. After the first retting, flax must be thoroughly dried, before it is put again in the water for the second operation.

Drying.—It is important that flax should be dried as quickly as possible, to prevent any further decomposition. For this purpose, it is spread between the holders, which are suspended under the drying sheds. These holders consist of a double wooden rod, fastened together by a wire staple and peg in the centre, and by metal rings at each end. The under rod is placed on a table, flax is spread evenly over it, and the upper rod is put on and fastened, as mentioned above. It takes fifty holders for each cwt. of flax, weighed when dry.

The flax has to remain three days under the drying sheds;—in favourable weather it will be quite fit for being tied and stacked; but if the atmosphere is damp, the drying must be completed by means of artificial heat, which should not exceed 90 to 100 degrees. This last process must be watched very carefully; for, if the flax be overdried, its quality may be considerably impaired. Flax must in no case be scutched immediately after drying; it should first be put into stacks, or under open sheds, where it has to rest. Six weeks is considered to be a sufficient time to bring it to its scutching point.

Scutching.—Flax can be scutched either by hand or by machinery. Hand-scutching, although productive of good results, when performed by a skilful workman, is not practicable on a large scale, owing to the difficulty of procuring the number of trained hands necessary for the work. Machinery must, necessarily, be resorted to. With that at present in use, the operation of scutching requires, on the part of the workman, practice and experience,—in fact, it is a profession of itself; a description would be quite inadequate to convey a correct idea of it, and would, in no case, enable a person to do the work who had not learned it practically. Machines have been brought out lately,

calculated to dispense with skilled labour, and there is every probability that they will be brought to work satisfactorily.

The shoves, or woody part, produced at the scutching mill, are used as fuel, three tons of which are equal to one ton of coals in raising steam.

Classing.—On leaving the scutch mill, flax has, finally, to be classed according to its quality and value, and to be made up into bundles, after which it is ready for market. Each rettery should adopt a regular classification for the different qualities, each being always represented by the same mark and denomination. This will facilitate the sale.

APPENDIX G.

New Machine for Cleaning the Tow-waste of Scutching Mills.

(Invented by Messrs. Calvert and Garnett, Cleckheaton, Yorkshire.)

In all scutching mills, a large quantity of waste is produced, consisting of portions of tow mixed with the *shoves* or woody dust detached from the fibre of the flax. A part of this, imperfectly cleaned, is usually separated, and sold under the name of "scutching tow," for coarse purposes, but the remainder has hitherto been totally worthless for any manufacturing uses, and is employed as *fuel*, although containing much fibre, as no means existed of cleansing it from the dirt. A very ingenious and effective machine has just been introduced by Messrs. M'Adam Brothers & Co., Soho Foundry, Belfast, which converts this hitherto valueless material into good saleable tow, worth from £10 per ton upwards. The machine requires about a horse power, and may be driven by a band from the shaft of a scutch-mill. The waste is spread loosely on a moving feeding-sheet, and is drawn in by rollers and thrown out at the opposite end of the machine, well opened and cleansed, presenting a very different appearance from that of the tangled and matted mass which entered the machine. No skill is required in the attendant, so that a woman or a boy is quite sufficient, and the machine will produce about 10 cwt. of cleaned tow in the day. It is not easy to form a correct estimate of the quantity of this material which is annually burnt or thrown away in Ulster, but as there are upwards of 900 scutching mills at work, the amount thus lost must be very large indeed. At the annual

meeting of the Flax Society, samples of the uncleaned waste, and of the same, after passing through the machine, were exhibited in the Society's rooms, and excited great attention. The machine was also exhibited at work in the Soho Foundry.

APPENDIX H.

Mr. Schenck's method consists essentially in the employment of hot water. It is strongly recommended by the Royal Belfast Flax Society, and has been long enough in operation to warrant the publication of the opinion which is now almost universally entertained of its merits. The following is a description of an establishment for the prosecution of Mr. Schenck's process, situated on the Newport river, county Mayo. It is taken from a report on the subject by Mr. M'Adam, the Secretary of the Belfast Society. He says, "The tenements, containing the vats and drying shelves, are simple wooden sheds, of cheap construction. In one end of the building are four vats, set parallel to each other, the length of the house. They are made of inch deal, in the form of a parallelogram, fifty feet long, six broad, and four deep. There are false bottoms perforated with holes. Underneath these are introduced the steam pipes, crossing the vats, and having stopcocks at their entrance, by which the steam can be let on from the main pipe, as required. The steam is generated in a small boiler, which also serves to turn two hydro-extractors—a patent apparatus used to drive off a portion of the water with which the flax is saturated, on being taken from the vats. The flax is packed into the empty vats, on the butt ends, in a half-sloping position, precisely as in the case of a steep pool, only one layer being the depth. The water is then let in, and a frame fastened over the top of the flax, answering the end of stones and straw, or sods, in the steep pools,—the prevention of the rising of the flax in the course of fermentation.

The steam is then let into the pipes by turning the stopcocks, and the water is some eighteen or twenty hours in becoming heated to the required point, 85° to 90°. The fermentation then commences, and no further steam is required, the action going on until the flax is thoroughly retted, which is in forty hours afterwards, being sixty from the time of the admission of the water. At the end of the sixty hours, the flax is taken out, the water allowed to run off, and the vat

permitted to cool. The same process is then repeated, with fresh water and fresh flax. When taken from the water, the flax is packed in the hydro-extractor, which is a round vessel of iron, made to revolve by steam power with great velocity, the water being driven out of the flax on the principle of centrifugal force. Thirty beets or small handfuls are placed in this machine at a time, and about twenty lbs. of water are extracted in three to five minutes. A few hours suffice for the contents of a vat, each vat containing two tons of flax straw. The hydro-extractor only separates a portion of the water; the flax now remains to be thoroughly dried. In summer, or indeed for six months in the year, this can be accomplished as usual by spreading on grass land in the open air. During winter, however, it is necessary to find other means of drying. A shed has, therefore, been erected, communicating by doors with the vat house, filled with ranges of shelves, composed simply of railings of lathwood in five or six tiers. The flax is spread lightly along these shelves by women, and the house is heated by steam-pipes. This house is capable of drying the full of one vat per diem. The flax when dried is made up in small beets or handfuls, of a size suited for feeding into the breaking rollers of the mill.

About ten vats per week can be steeped in this establishment, say twenty tons weight of straw, and producing, say two-and-a half to three tons of fibre. Thus, in one year, such an establishment would be capable of turning out 120 to 150 tons of flax for market, being the produce of 400 to 500 statute acres. The fuel used for the boilers is principally 'showes,' with a small quantity of turf. Mr. Bernard estimates the cost of steeping, drying, heating, and scutching the flax at £10 to £11 per ton, which is £3 per statute acre. Subtracting say 10*d.* per stone, or 6*s.* per cwt. for scutching, the cost of steeping and drying would thus appear to be about 24*s*, per acre,—a sum certainly less than the usual estimates of these operations, as commonly performed by farm labour.

APPENDIX I.

Plantain Fibre.

There is ample reason to believe that we may safely congratulate West Indians on the completion of a machine which promises to be of the utmost importance to these Colonies, by which the fibre of the

Plantain is cleaned and prepared in the most simple, cheap, and expeditious manner. Attempts to construct such a machine have for several years occupied the attention of some of the ablest mechanicians of Europe, and have caused a vast expenditure of time, labour, and money without success. Many expensive and ingenious machines have been made and patented; but all have failed when brought into full operation, owing partly to the peculiar nature of the substance to be acted upon, and partly to ignorance respecting its nature and qualities. All the inventors acted on the principle of crushing the stem of the plant, and combing out the substance, filling up the interstices between the fibres, thus freeing them from native impurities. This appears to have been a false principle, and is the chief, if not the only, reason of all the failures that have resulted. But the failure of one party only stimulated others to greater exertion of mind, and greater diligence in developing their plans. The valuable qualities of the Plantain fibre for the manufacture of many descriptions of textile fabrics, for which flax, hemp, and even silk, are now used, as well as cordage and paper, held out the prospect of a rich reward to the successful inventor of a suitable machine for its preparation; and therefore it was that so many engaged in experiments which they deemed likely to realize their hopes of success. But the honour, the gratification, and, we hope we may add, the profit, that have hitherto eluded the grasp of so many ardent and anxious experimenters, seem to have fallen to the Honourable Francis Burke,* the Puisne Justice of Montserrat. This gentleman has been for several years experimenting in various ways on the Plantain stem, and trying to procure the fibre in a suitable state for manufacture; and it gives us great satisfaction to say he appears to have at last succeeded, even beyond his most sanguine hopes.

He has completed a small machine which perfectly cleans the fibre, and leaves a beautiful white silky substance, resembling flax, only that it is about three times the length of flax, capable of being manufactured into any description of textile fabric, from the finest cambric to the coarsest sail-cloth. There are some specimens of the fibre now at this office for the examination of those interested in such matters.

We have not seen the machine; but several gentlemen of this island have witnessed its operations, and they declare that its simplicity of action, the ease with which it can be worked, the impossibility of its

* Now (December, 1854,) arrived in England with his machine, and with a quantity of the Plantain-stems to show its actions upon them.—Eds. *Journal of Botany.*

going wrong and injuring the fibre, and its extreme cheapness, are surprising. A piece of the stem of the plant is held by one end in the hand, passed into the machine through the "feeder," and, being still held in the hand, is drawn out again perfectly clean and white. It can be worked either by the hand, by a mule, by water, wind, or steam power, according to its size. To work it requires no skill; a little boy or girl to "feed" it, is all that is requisite to ensure its satisfactory operation. The fibre cleaned in the course of the day is ready for shipment the same evening. A small machine to be worked by the hand, which will cost little more than three guineas, irrespective of any patent right, will, with the assistance of a little boy or girl to feed it, clean about 150 lbs. per day, and is so portable, being contained in a box about eighteen inches square, that it can be taken to the spot where the plantains grow; they may be cut down, prepared, and the fibre carried home in the evening, ready for shipment. It can also be made on any scale—large enough to clean a ton a day if requisite. So small is the waste, that from 75 to 80 per cent. weight of prepared fibre is procured from the plant, irrespective of its watery particles. And this waste substance is a valuable pulp, which requires only to be washed to fit it for manufacture into the finest writing-paper. The pulp alone, it is reckoned, will pay the cost of working, and the fibre will be net profit.

Mr. Burke, whose indefatigable experiments and researches into the nature of West India fibres, and the best mode of preparing them for the manufacturers' use, seem to be now crowned with success, has determined, so soon as the accident from which he is now suffering (which we mentioned a couple of weeks since) permits, on going to England to procure a patent. He also intends to apply for patents in each of these Colonies. We learn that the machine will be exhibited, and its operation shown, at the Industrial Exhibition in this island (Antigua) next month.

We omitted to state that the Dagger (the Aloe), and all the fibrous tribes of the West Indies, are as readily and as perfectly acted upon as the Plantain.

APPENDIX J.

Price's Patent Candle Company, Belmont, Vauxhall, London.

Sir William Hooker, *Royal Gardens, Kew.*

My Dear Sir,—Acting upon your suggestion, and hoping to induce your correspondents to examine any wax berries, oil nuts, or oil seeds,

they may come across during their travels, and to assist them in ascertaining the commercial value, I have noted down a few hints, which I have now the pleasure of sending you.

Every oil, or grease, whether solid or liquid, if not poisonous or acrid, like croton oil, or viscid and gummy, like castor oil, or drying, like linseed oil, must be worth in London at least £30 a ton. Among greases solid, at above 60° Fahrenheit, the higher the melting point (other things equal), the greater the value; for example, the vegetable tallow of Borneo melting at about 90° Fahrenheit, is worth at least £5 a ton more than the cocoa-nut oil of Ceylon melting at 70°. The effect of the soap duty having been taken off, may probably, before long, materially change the relative values of greases; but, at present, liquid oils, like the ground nut *(Arachis hypogea)*, are worth more than soft solid oils, like the Bassia butter of India, as they require less manufacturing to fit them for use, the liquid oils after a simple treatment in a cheap apparatus, being fit for burning in lamps, while the soft solid oils, being neither hard enough for use in candles, or liquid enough for use in lamps, require to go through a press before they are saleable, except for soap making. Greases may have particular advantages, such as being little acted upon by the air, and therefore not easily becoming rancid, good qualities, which can only be ascertained by experiments; which your correspondents had perhaps better leave to us.

Since I last had the pleasure of writing to you, we have been engaged in some experiments upon oils, for use in medicine, in which it seems probable they will take an important place; already one vegetable oil has been found to be almost as efficacious as cod liver oil, with the advantages of being less unpleasant and cheaper. On account of this new use, it might be well to collect small quantities of oils, even if they did not obey the conditions mentioned above. The value of oil must depend a little (especially when found in out-of-the-way places) upon the way it is held in its matrix; for example, the oil of the Lumbang-nut *(Aleurites triloba)* can be separated with much less labour and simpler machinery than the cocoa-nut oil, which requires very great pressure to extract it from the copperah, or dried cocoa-nut kernel.

Waxes are worth more than greases, on account of their very high melting points; their relative values depend upon colour, transparency, and freedom from resinous matter. Resin may be easily detected by lighting a small piece of the wax; the more smoke, the greater proportion of resin, and therefore less value; the paler and more transparent

the wax the better. The most valuable tree wax known, is the beautiful insect wax of China.

A simple way to try an oil nut, is to crush it with a stone, and then squeeze it between your finger and thumb; if it contains any considerable quantity of grease, enough will be pressed out to judge of colour, hardness and sweetness; if the nut tastes oily, and yet oil does not come out by this treatment, it is well to dry the kernel before squeezing; and, in the case of nuts containing grease solid at a high temperature, like that of the *Myristica sebifera*, it is well also to heat the nut. Where a stearic candle can be got, and is burned down a little, until it has formed a cup, and then blown out, if into this a little of the material to be tried is placed; after a moment's burning, the candle material with which the wick is saturated is burnt out, the new material to be tried, in the cup takes its place, and becomes the material supplying the wick until the cup is emptied, and so can be judged of, or a piece of string dipped in the oil or melted grease makes a very tolerable wick, or simpler still, where the nut is very full of oil, if lighted at one end, it will at least show what tendency to smoke there is, and the colour of the light.

Some of the resins ought to come in for candle making, though I believe that they have never been extensively used, except for the commonest sorts of candles, on account of their giving off so much smoke; but as some descriptions smoke less than others, there is a hope that new ones may be found smoking still less, these would then be very serviceable in candle making. The points connected with new greases, &c., that we should be most thankful for information upon, are, the manner of growth, probable expense of collecting, means of transport, and quantity likely to be obtained, with small specimens of the grease, if manufactured, and of the fruit, with both its husk and hard shell, where these exist.

I have, &c,

5th December, 1853. GEORGE F. WILSON.

Communications respecting various Seeds and Plants, useful and ornamental, collected in the Central and Eastern Provinces of China, and forwarded to the Society, by R. FORTUNE, ESQ.

In accordance with instructions received from the Government of Bengal, I have the pleasure to send you a large

collection of seeds, &c., which I have collected for the Society during this autumn and winter in the Central and Eastern Provinces of China. The box containing these seeds has been shipped in one of the Peninsular and Oriental Company's steamers, which leaves this Port to-day, and I have the honor to enclose a bill of lading, by which you will observe the freight is made payable in Calcutta.

All the seed papers are marked with names and numbers, and I also enclose a detailed list of the whole in this letter. You will observe I have included five varieties of rice grown in China, and I have given you the names by which they are known, in order that larger supplies may be procured, should you consider all, or any of them, of sufficient value.* I also send two kinds of millet which are extensively grown in the tea districts, and often between the rows of the bushes, in order to afford a slight shade during the hottest weather in summer; specimens of these in ear are also sent for the Society's Museum.

When in the Province of Chekiang last autumn, I procured a specimen of the Hemp Palm *(Chamœrops sp.)*, and I now send you a portion of its stem, showing the large quantity of fibre it forms under the leaves. This fibre is of great value to the natives, who use it for a variety of purposes, such as ropes, cables, twine, brushes, hats, cloaks, &c., &c. The detached sheets I send in the box will shew how it is cut from the tree. I trust these articles will be acceptable additions to the Museum of the Society.

Nos. 13, 14 and 15 are seeds of plants cultivated in China for their fibre, and which, if not already in India, are well worth introduction. One of them—the Lūk Mä—seems identical with the Indian "Jute," which is now becoming an

* These have been tried at Darjeeling, in the Punjab, and some other parts of India, but found to be of inferior description to the rices cultivated here. —Eds.

article of considerable importance.* No. 9 contains seeds of the "Tung-ean," from which a valuable wood oil is expressed, much used by carpenters. No 10 contains seeds of a kind of hawthorn, from which excellent jellies and other preserves are made. Nos. 20, 21, and 22, are used as soap by the natives, and the latter is that described by Dr. Falconer in the seventh volume of the Society's *Journal*.

In addition to these various productions I must draw attention more particularly to Nos. 18 and 19. These papers contain ripe seeds of the *Green Indigo* (so-called,) which is so much thought of by the French chemists, and to which my attention was directed by Dr. Falconer and Mr. Henley through the Government of India and the Society.† I have also succeeded in procuring plants of the cultivated kind, which I shall take an early opportunity of forwarding to the Society. I need not remark upon the importance of taking great care of these seeds, but I may suggest the propriety of sending a portion of them to a cooler climate than that of Bengal, say to the N. W. Provinces or Assam, where they will probably succeed quite as well as they do in China.‡ As I gain more information concerning this important dye, I shall not fail to communicate it to the Society.

I have only to add, further, that the box contains a good supply of the seeds of various ornamental trees, such as *Cryptomeria japonica*, and the Funereal cypress, which I hope will one day produce useful timber, and give another feature of beauty to the Indian landscape.

* The plants obtained from this seed belong to *Corchorus olitorius*, which yields the jute fibre of commerce.—Eds.

† See *Journal* of the Society, Vol. VIII, p. 232.

‡ These seeds have been distributed to members in Assam, Darjeeling, Chota Nagpore, Baugulpore, various parts of the Punjab, &c. They have germinated most freely in the Society's garden, where a large stock is retained for distribution in due course. The plant belongs either to the *Rosaceæ* or *Rhamnaceæ*, a point which will be determined on flowering.—Eds.

Box No. 2—Chinese Seeds for the Agri-Horticultural Society of India.

No. 1. Chinese rice, ("Hong-men-tsing-co")—is sown in the 3rd month, and ripe in the 10th; planted between the rows of the early kind, No. 3, and from 10 to 20 days later.

„ 2. Ditto ditto, ("Peh-men-tsing-co")—sown, cultivated and reaped as No. 1.

„ 3. Ditto ditto, ("Tsa-co")—sown in the 3rd month, and ripe in the 7th—a very early ear.

„ 4. Ditto ditto, ("Tsa-gno-co")—an early ear, like No. 3,—much used in making ardent spirits.

„ 5. Ditto ditto, ("Kwie-hwa-gno-co")—sown in the 4th month, and ripe in the 9th. Chiefly used for distilling purposes.

NOTE.—Nos. 4 and 5 are grown by themselves, that is, other later or earlier kinds are not planted between the rows.

„ 6. Millet, ("So")—sown in the fourth month, and ripe in the 10th.—Hill sides in Chekiang, &c.

„ 7. —— ("Lu") sown in the 3rd month, and ripe in the 6th. Samples of 6 and 7 in this box.

„ 8. *Chamærops sp.*,—Hemp Palm of Central and Eastern China, with specimens of fibre and seeds.

„ 9. *Eleococcus oleifera*—A tree from which a valuable wood oil is prepared.

„ 10. *Cratægus Layii*—the fruit of this tree makes a very fine preserve, much esteemed in China.

„ 11. Buck-wheat, *(Polygonum sp.)*

„ 12. Indian Corn.

„ 13. "Lŭk-mā," (Jute ?)—Cultivated for its fibre.

„ 14. "Tung-mā," (Malvaceæ)—ditto for ditto.

„ 15. Hwang-mā" (Cannabis ?)—ditto for ditto.

„ 16. Ligustrum lucidum—a fine evergreen.

„ 17. Salisburia adiantifolia—one of the largest trees in Central China.

„ 18. "So-lo" (cultivated)—This is the "*Lo-yan*" from which the fine "*green indigo*" is said to be extracted.

„ 19. "So-lo" (Wild.)

„ 20. Round soap.

„ 21. Shanghae soap bean.

„ 22. *Cæsalpinia sp.*—Common soap bean.

„ 23. *Cryptomeria japonica*—Japan cedar.

„ 24. *Cupressus funebris*, Funereal Cypress.

SHANGHAE: 30*th Dec.*, 1853.

I have the pleasure to enclose a Bill of lading and list for four cases of plants and seeds collected by me for the Agri-

Horticultural Society of India. These cases were shipped at Shanghae on the 19th of January, and I have now seen them re-shipped at Hongkong for Calcutta. They contain a number of plants, which I believe to be of great value and interest, and I hope they will reach you in good order.

The detailed list which I enclose will give you nearly all the information which is requisite, but I cannot help drawing particular attention to the *Green Indigo* plant (so called) the "Lo-Yan" or "So-lo" of the Chinese, which I have discocovered this year in the Province of Chekiang. In my last dispatch I sent you some seeds of this valuable species, and I have now the pleasure to send six healthy young plants in cases No. 3 and 4. These cases contain also a number of cuttings of another plant, which is extensively cultivated in the same province on account of a blue dye which it furnishes, and which is, in fact, the indigo of that part of China. I have sent a detailed account of the cultivation and manufacture of this important dye to Professor Lindley for publication in the "*Gardener's Chronicle* and *Agricultural Gazette*," and must refer you to that journal for further particulars.*

With regard to the fruit trees in these cases, I may draw attention to the "Yang-mae" *(Myrica sp.)*, which I think will be valuable in India;† to the "Kum-quat" *(Citrus japonica)* well known from the excellent preserve of that name, which is made from it; to the Shanghae and flat

* The information referred to by Mr. Fortune will be found among the "Selections," in the present number. The plant in question has not yet flowered with us, but will probably be found, on further examination, to be *closely allied* to, if not identical with the "Room" dye plant of Assam, which is a species of *Ruellia*.—Eds.

† Mr. F. refers to this fruit in another paper, where he writes: "The Chinese have a fine variety of this fruit which ought by all means to be introduced to the Himalayas. It is as large as an Orleans plum, and as superior to the Indian one as the apple is to the crab."—Eds.

peaches, two kinds of great excellence, and to some seeds of the Chinese chesnut, which I have sown in the soil of case No. 3, and which will probably vegetate on the voyage to Calcutta.

Amongst other things of interest on account of their useful properties, I may notice the Varnish tree, the Wax insect tree, the Hemp palm, the Soap bean tree, and the *Salisburia*, which forms one of the largest timber trees in the Central and Eastern Provinces of China.

The other plants in the cases are of an ornamental kind. Most of them have been introduced to Europe within the last ten years, and will be found described and figured in the various botanical and horticultural periodicals.

In conclusion, I have the honor to acknowledge the receipt of your letter, dated Nov. 18th, enclosing a translation of a memoir by M. Persoz, and a list of plants you are desirous of receiving from China. I have also to acknowledge the safe receipt of your bill on the Oriental Bank for £200, and shall endeavour to spend that sum in a way that will tend to promote the interests and honour of your Society.

List of plants and seeds in glass cases, marked A. H. S. Nos. 3, 4, 5, 6.

A. H. S. No. 3.

No. 1. Green dye plant " Lo-yan" or " So-lo" of the Chinese, 3 plants.
2. Ditto ditto, ... 3 plants.
3. *Citrus japonica* (" Kum-quat,") .. .. .. 3 plants.
4. *Justicia sp ?*—(a plant largely cultivated for the blue dye it produces)—cuttings.

NOTE.—Chesnuts (Chinese) are sown in the soil of this case; they will germinate on the voyage.

A. H. S. No. 4.

No. 5. *Cæsalpinia sp.?*—Common soap bean tree, ... 3 plants.
6. *Myrica sp.* (" Yang-mae")—a fine fruit tree, .. 1 plant.
7. Green dye plant. (same as No. 1,) .. .. .. 3 plants.
8. Ditto ditto ditto,.. .. .. 3 plants.
9. *Dielytra spectabilis*—a beautiful herbaceous plant,.. 1 plant.
10. *Justicia sp.* (blue dye same as No. 4.),—a bundle of cuttings.

NOTE.—Some pods of the soap bean sown in this case.

A. H. S. No. 5.

No. 11. *Azalea vittata* (a fine new striped species,) .. .. 3 plants.
12. *Chamærops sp.* (the hemp palm—see sp. in the Soc. Museum,) .. .. 1 plant.
13. *Forsythia viridissima*, (a fine spring-flowering shrub.) 1 plant.
14. *Wiegela rosea*, (a very ornamental bush,) .. .. 1 plant.
15. *Salisburia adiantifolia* (the largest tree near Shanghae,) 1 plant.
16. *Jasminum nudiflorum* (a fine winter-flowering species,) 1 plant.
17. *Chamærops sp.*, (hemp palm, same as No. 12,) .. 1 plant.
18. *Wiegela rosea* (same as No. 14,) .. .. .. 1 plant.
19. *Azalea amœna*, (a very pretty new variety,) .. 1 plant.
20. *Viburnum dililatum*, (a fine new Gueldres rose,) .. 1 plant.
21. *Azalea sp.* .. .. 1 plant.
22. *Chamærops sp.* (hemp palm,) .. .. .. 1 plant.

A. H. S. No. 6.

No. 23. "Oo-dung" of the Chinese—(an ornamental tree,) .. 1 plant.
24. Flat-Peach of China—(a delicious fruit,) .. .. 1 plant.
25. Shanghae Peach, (a very large variety,) .. .. 2 plants.
26. *Fraxinus sp.* (the true wax-insect tree,) .. .. 2 plants.
27. Shanghae Peach (same as No. 25,) .. .. .. 2 plants.
28. *Rhus sp.* (the true varnish tree,) .. .. several plants.

HONGKONG: 14*th February*, 1854.

On the 14th of February I had the pleasure to send you a bill of lading for four cases of plants and seeds collected by me for the Agri-Horticultural Society of India. To-day I beg to enclose you another bill of lading for a case shipped in the steamer "Shanghae," advertised to sail on the 13th instant.

The list which I enclose will give you information as to the contents of the case, which I hope will reach you in good condition. I beg to draw your attention more particularly to the *rice paper plant** (No. 3), which is a species of great interest.

I had the honor to receive your letter dated February 18th, acknowledging the receipt of the box of seeds (No. 2), and I am glad to hear they reached you in good order.

* This plant *(Aralia papyrifera)* is doing well in the Society's garden.—EDS.

It will afford me much gratification if you will send me a report upon the state of each consignment, and any hints which you may consider necessary for my guidance shall have my best attention.

In laying this communication before the Society, I beg you will assure the Council and Members of my earnest desire to assist them in conferring great and lasting benefit on the people of India.

List of plants in case marked A. H. S., No. 7., for the Agri-Horti. Society of India.

No 1. Loquat *(Eriobotria japonica)* grafted, (Canton.)
„ 2. Pumelow, (Canton.)
„ 3. Rice paper plant, (Formosa.)
„ 4. Lime, (Canton.)
„ 5. *Azalea Indica*, (Canton.)
„ 6. *Lycopodium, sp.* ("Man-neen-chang" of the Chinese,—Hills of Hongkong.)
„ 7. *Spathaglottis Fortunei*, (8 plants.)

HONGKONG : 14*th March*, 1854.

I have the honor to advise you of having sent to your address (care of the Peninsular and Oriental Company's agent in Shanghae,) a packet of "cabbage oil seed"—*Brassica sp.*,—which is largely cultivated in this part of China, *is very productive*, and the oil which it yields appears excellent in quality. I dare say you cultivate the *Brassica* for its oil in India as well as we do in Europe, but you may not have this particular variety, and I therefore send you its seeds, in order that some of your members resident in oil-producing districts may give it a fair trial. It is what we call a winter-crop in this part of the world—that is, it is ready to be planted in the fields when the rice crop is removed. In other words, it is sown in the end of September and planted out about the end of October. It ripens in May, in time to be replaced by the later varieties of rice.

I believe I had the pleasure of sending the Society a bag of this seed last year, but it probably arrived too late for a fair trial.

Your letter, dated the 20th April, came safely to hand, and gave me much pleasure. The results of my last year's shipments to the Society seem to have been most successful, and I have no doubt you will save a portion of every thing sent round. The loss of a few duplicates does not matter, for such things as you allude to are easily propagated.

TEMPLE OF TIENTUNG: 30*th June*, 1854.

I had the honor of writing to you on the 30th of June last, and then advised you of the dispatch of another supply of Chinese cabbage oil seeds, and some samples of cotton cloth dyed with the celebrated "green indigo," of which I sent plants and seeds to the Society last winter.

I have now the pleasure to inform you that I have procured for the Society 35 nice healthy plants of those beautifull varieties of tree-pæony *(Moutan)*, formerly discovered by me in this district, and introduced to Europe a few years ago. You will find some of these figured in our botanical periodicals, such as *Paxton's Flower Garden*, to which I refer the Fellows of your Society for an idea of their beauty. The case in which I have planted them is now sent onwards in the P. and O. steam-ship "Lady Mary Wood," as per enclosed bill of lading.

I do not think these pæonys will succeed in the climate of Calcutta, and would recommend them to be sent to some of your members who reside in the northern hilly districts of India, where there is frost in winter.

SHANGHAE: 30*th September*, 1854.

In my last letter to you, dated Sept. 30th, I had the pleasure of enclosing a bill of lading for a case of *Moutan* pæonys,

which I had procured for the Society. To-day I enclose another list and bill of lading for one box of seeds, and one case of plants, which I have shipped in the "Lady Mary Wood."

In the box you will find a good supply of the seeds of *Cryptomeria japonica*, which I trust will be acceptable to your members who reside in the hilly districts of India. I also send you seeds of the beautiful *Cephalotaxus* discovered by me in China some years since, and now much prized in Europe, where it is perfectly hardy, also a further supply of the Chusan hemp palm seeds. In addition to these, I again send seeds of the two species which yield the "green indigo," in case those formerly sent failed to vegetate.

In the glass case No. 12, I may draw your attention more particularly to the Ningpo lemon, a fruit which is much esteemed by the Chinese on account of its fragrance. In the autumn when this fruit ripens, it is met with in all the houses of the rich. An ornamental plate of old China, on a stand, is filled with the fruit piled one above another, and placed upon a table in the hall or reception room; here it remains for several weeks, and diffuses a delicious perfume throughout the house.

In this case there are also plants of the "wax insect tree,"* the soap bean tree, the hemp palm, and a hardy variety of orange, suitable for a cool hill climate, where the common China orange will not succeed. As ornamental plants, I send you the *Anemone japonica*, *Gardenia Fortunei*, and *Lilium speciosum*, and in the soil of the case I have sown a quantity of the seeds of chesnut and *Salisburia*. The Chinese chesnut is an excellent variety, quite equal, if not superior, to the Spanish. By sowing its seeds in a case in this way, I was fortunate enough to introduce it to the

* This tree is succeeding so well in the Society's Garden, that a requisition has been made to Mr. Fortune for a supply of insects.—Eds.

Himalayas last year, and I trust the Society will be as successful with those now sent round.*

I shall be glad to have a report upon the state in which these various plants and seeds are received by you, and whether they are acceptable to the members of the Society.

List of plants and seeds in Cases Nos. 11 *and* 12.

A. H. S. No. 11 contains seeds:

Cryptomeria japonica (a box full.)
Cratœgus Layii.
Green dye plant (cultivated kind.)
Ditto ditto ditto, (wild kind.)
Cephalotaxus Fortunei (a fine new evergreen.)
Chamœrops sp. (Chusan palm.)

A. H. S. No. 12 contains plants:

1. *Anemone japonica* (several plants.)
2. *Fraxinus sp.* (wax insect tree) 3 plants.
3. *Gardenia Fortunei.*
4. Lemon from Ningpo (a very fine variety.)
5. Hemp palm (a pot of seedlings.)
6. *Lilium speciosum* (a very beautiful variety.)
7. Soap bean tree (2 plants.)
8. Orange (a northern variety, suitable for Hills.)
9. Hemp palm (a pot of seedlings.)
10. Lemon (same as No. 4)

Seeds of chesnuts sown in the soil of this case; do. of *Salisburia:* Ditto ditto, ditto.

SHANGHAE: *3rd December,* 1854.

By this opportunity I have the pleasure to send you a small box (No. 13) filled with seeds, &c. The seeds of the

* Upon referring to my list, I find that seeds of these chesnuts were also sent to the Society last year. I trust they have succeeded.—R. F. They germinated freely, and there are now upwards of one hundred seedlings on hand. It is also gratifying to record that a great proportion of the seeds received from Mr. Fortune has succeeded well; most of the plants are thriving, more especially the green dye plants, the *Fraxinus sp.* Hemp palm, soapbean tree, *Salisburia*, and fruit trees of sorts.—EDS.

"Amoy pummelow," and "Ningpo lemon" are well worth the attention of the Society. The *Photinia* and juniper are both beautiful trees from the province of Chekiang, and will, no doubt, thrive well in the temperate hilly districts of India. The hemp palm has been sent to you several times before, but you cannot have too much of this useful tree.

Chamærops sp. (hemp palm.)

Juniperus sphærica (a fine new tree from the province of Chekiang.)

Photinia species (a beautiful evergreen from ditto, ditto.)

Amoy pummelow (the finest fruit of the kind in China.)

Ningpo lemon (a very fragrant kind.)

HONGKONG: 19*th March*, 1855.

Communication on samples of various productions from Major S. F. HANNAY'S *experimental farm at Deebroghur in Upper Assam.*

To the Secretary to Agri-Horticultural Society,

DATED FORT WILLIAM, 16*th May*, 1854.

Land Revenue.
H. RICKETTS, ESQ.

SIR,—I am directed by the Board of Revenue to forward herewith a box containing samples of various productions of Major S. F. Hannay's experimental farm at Deebroghur in Upper Assam, together with a copy of a letter dated the 17th February last, from Major Hannay to the Collector of the district regarding the samples.

I have, &c.,

A. GROTE,

Officiating Secretary.

CAPTAIN E. T. DALTON,

Collector of Zillah Luckimpore, Deebroghur.

SIR,—I have the honor to acquaint you that, with a view to making known the productive qualities of the soil of this

section of the Luckimpore district, I have put up the samples detailed underneath in a small box, and would feel much obliged could you conveniently forward the same to Colonel Jenkins, the Commissioner of the Province, for submission to the Board of Revenue.

1	Tea, Pekoe kind unsorted, ...	1 canister,
2	Tapioca flour, ...	1 ditto.
3	Rice, ...	1 bag.
4	Silk common (ungummed), and in the original state, ...	several small hanks.
5	Cotton (Petti-Gulf)	1 small parcel.
6	Ditto (Sea Island), ...	1 do. do.

2nd. The articles here enumerated are past year's produce of my experimental garden, a patch of ground lying contiguous to this station, and formerly a waste tract of tree and grass jungle, with the same soil however and undulatory surface which prevails throughout the Muttuck district, and I may say, that including a patch of sugar cane, all have grown up side by side without any particular preparation of the soil, beyond mere surface hoeing aad weeding. The rice being the produce of the low portion of the land subject to inundation in the rainy season.

3rd. The tea is from plants eighteen months old from China stock, having procured the seed from Chabrua, formerly the Government experimental tea garden. There can be no doubt in my opinion from the flourishing appearance of tea plants (China stock) growing in other gardens besides my own, that both soil and climate are suitable to its healthy growth and productiveness. I may observe that Deebroghur is in Latitude 27°32′, and the varieties of temperature throughout the year are much the same as prevails in the black tea country of China, visited by Mr. Fortune. The height of this district above the sea level I am not certain

of; it may however be above 500 feet. None of the tea plants in this station are four feet above the high-water mark of the Burrumpooter. The tea sample is manufactured by an Assamese.

4th. The sample of tapioca flour is made from the root of the sweet manihat plant of Assam generally.

5th. The rice is from Johu *dhan* or paddy, peculiar to Assam I believe, and is considered a good table rice.

6th. The samples of silk are from a cocoon common in this district, the worms producing so long as there are leaves to feed them. Of the productiveness of the silk worm I am at present unacquainted; but I found 8½ seers of this cocoon produced one seer of thread. I merely tried this as an experiment, having planted out slips of a foreign description of mulberry in hedges.

7th. The samples of foreign cotton are the produce of plants reared from acclimated seed, and some I got last year from the Agri-Horticultural Society of India, neither of which was very good: I think I may state that the Sea Island is mostly from plants two years old. I offer these samples with diffidence, but from my observations on the growth of these foreign cottons, I think that good acclimated seed of the district will eventually afford good crops. All that appears necessary is that the plants reach such a state of maturity as to be in full flower towards the end of the rains, and this may be managed by sowing the Petti Gulf, of which I have great hopes, in the end of May or June. Both kinds, I think, require shelter from our alternate hot sun and heavy rains. This year I shall try a small quantity of the Sea Island with the Assoo crop of paddy next month, and if this succeed, it can be cultivated very cheaply.

8th. With regard to the sugar cane, samples of which cannot be sent from its bulky nature, it is, I believe, considered of first-rate quality of Otaheitan stock, and this year I am glad to say I have been enabled to supply some thousand of

canes and tops to the neighbouring ryots, and hope to see this cane soon take the place of the common worn-out cane of the district.

I have, &c.,

DEEBROGHUR: 17*th Feb.*, 1854. (Signed) S. F. HANNAY, *Major*, *Commg.* 1*st A. L. I. B.*

Some account of the Chinese Green Indigo Plant, with specimens of the Dye. Communicated by ROBERT FORTUNE, ESQ.

I am particularly gratified to hear you received the green dye plant in safety. I am using every means in my power to gain further information about this interesting production, but you must remember I am in China, where if one is not actually in the district where the substance is produced, to see with his own eyes, he finds the greatest difficulty in obtaining correct information. However, in getting possession of the plant, one step has been gained. In knowing that the dye is produced from the bark is another step in the right direction; and I have now the pleasure to send you two specimens of the cotton cloth which have been dyed with this substance. The small one is part of that taken home to France some years ago, the larger I purchased in a town in the province of Chekiang, about 60 or 70 miles distant from the country where the plant is extensively cultivated, and where the dye is no doubt made. I shall probably be able to send you a sample of the dye itself in a month or two, and I shall at all times be most happy to communicate any information on this or other matters of interest to the members of the Society.

TEMPLE OF TEIN-TUNG : 30*th June*, 1854.

In compliance with the wish expressed by the Society I have lost no opportunity of getting information concerning the *green indigo*, (so-called), of which I sent you seeds

and plants last year. In a country like China, investigations of this kind are extremely difficult, partly owing to the ignorance and partly to the apathy of the natives. A Chinese, as a general rule, knows little of any art or manufacture in which he is not personally interested, more particularly if it is not carried on in his own district. Hence the strange and contradictory statements which used to be put forth on the difference between green and black tea, one party asserting the impossibility of making the two kinds from one plant, another that green tea was dried in copper pans, and such like nonsense, which has only been dissipated of late years by actual observation in the country itself. With these facts before me, I naturally received with great caution the various statements made to me by Chinese, with reference to the manufacture of this green dye, and as I had no opportunity of witnessing the manufacture myself, I preferred making some experiments in connection with the information I received from the Chinese. As the results of these experiments are sent to the Society in box 13, I shall now proceed to give you the history of them.

I was informed that the seeds of both kinds (wild and cultivated) were used largely in dyeing paper. A specimen of this paper procured in Ning-po is now sent as a sample for the Museum of the Society. Both the species produce seeds in great abundance, I had no difficulty, therefore, in procuring a small quantity of each for my experiments, and I now send you the extract which I prepared from them. The extract from the seeds of the cultivated species which I have evaporated on paper, is yellowish in colour, while that from the wild kind is of a purpleish or violet tint, and apparently very beautiful. These mixed together give a green of various shades, according to the proportion of each kind, and this colour is much varied and improved by the addition of alum, sulphate of iron, and such substances used as mordants by dyers.

The Chinese invariably informed me the seeds were employed to dye paper only, and that cotton and silk fabrics were dyed with the bark. I could obtain no information as to the method of removing the bark from the stems, and from some experiments of my own, I considered the process would be slow and difficult. The Chinese, however, often astonish me by the simplicity of their operations, and I had many reasons to suppose they had some easy mode of getting the bark, which was not apparent at first sight. With a view to get information on this point, I made many enquiries as to the place where the manufacture of this dye is carried on, and at last succeeded in satisfying myself that it was near a city named Kia-hing-foo, situated between Hang-chou-foo and Shanghae. I had visited this city some years since, but had no time to repeat the visit after obtaining the information in question. I therefore communicated it to Dr. Lockhart of Shanghae, who entered warmly into my views, and promised to aid my enquiries in every possible way. On reaching Shanghae in December last, I found that the Rev. Mr. Edkins, of the London Missionary Society, had passed through the Kia-hing district, on his way to Hang-chou-foo, and had succeeded in procuring a bundle of chips in the markets there. The chips are now sent to you, and are no doubt in the form in which the dye is extracted from them by the natives. Thus another step has been gained in this investigation, and indeed there can be little difficulty in finding out, by repeated experiments, the remainder of the process. Dr. Lockhart boiled down a portion of these chips, and obtained the extract which I now send you in a small porcelain box.

I have thus given you all the information I have been able to collect upon this subject, and as I send you the various substances with which I have been experimenting, you will be able to carry the matter further with the aid of chemists and other scientific men in India. If I have not

been led into some error, my experiments would seem to prove the truth of what the Chinese have always told me, that the *two species* were necessary to the production of the colour in question. This fact, however, will not affect the intrinsic *value* of the dye itself.

In conclusion, allow me to suggest to the Society that it might be useful to send a portion of these substances to the Academy of Sciences in France, for the inspection of M. Persoz,* and other distinguished French Chemists.

1 Paper of chips, as sold in the markets.
1 Box of extract from chips.
} cultivated kind.
1 Extract from seeds of wild kind.
1 Do. from seeds of cultivated kind.
1 Do. from two kinds mixed.
1 Sample of paper dyed by seeds.

HONGKONG: 19*th March*, 1855.

On the Tobacco of Kyoungree, with specimens of the leaf and of the soil in which it is raised. Communicated by Messrs. WILLIS AND EARLE.

Wishing to obtain a small quantity of the best Sandoway tobacco, some seed of the same, and samples of the soil in which it is grown, for analysis, we applied in April last to Captain Cannon, Marine Assistant Commissioner at Akyab, to assist us in procuring them. This gentleman, in reply, very kindly undertook to do so, and told us that he had written to Dr. John Davies, Officiating P. A. Commissioner at Sandoway, requesting him to procure for us, if possible, what we wanted.

On learning this, we immediately wrote to Dr. Davies on the subject, indicating some of the sites, (above the tidal influence,) in which, by former communications made to the Society, it appeared that the best tobacco was grown and cured.

* These specimens have been transmitted to M. Persoz.

Dr. Davies, in the most kind, prompt, and public-spirited manner, responded to our application, shewing by his communications to us, a most anxious desire, by every means in his power, to extend and improve the useful productions of India.

By the *Fire Queen* we received from Dr. Davies, on the 9th instant, a small quantity of the best kind of tobacco he has been able to procure, grown at "Kyoungree,"—also a box containing three samples of the soil, taken from the surface at six inches depth, and at from six to eighteen inches depth, and a canister of seed sufficient we should think for Bengal.

Of the first, say tobacco leaf, we now send you a sample, and also a box containing three baskets, which we have numbered 1, 2, and 3, of the soil :—

No. 1 ticket—"Surface earth from Kyoungree in Sandoway, 25th May, 1854."

[On this ticket Dr. D. writes, "I shall write more fully regarding these samples of earth that were obtained in my presence from the best tobacco plantation, and packed before me. J. D." But as he was on date of his last communication about to remove to his newly-appointed station, Bassein, and had his hands quite full of business, he has not as yet done so.]

No. 2 ticket—"Earth from Kyoungree found at six inches from the surface. J. D., Sandoway, 25th May, 1854."

No. 3 ticket—"Sample earth from Kyoungree below six, and extending to eighteen inches.

J. Davies, M. D.
O. P. A. C."

And of the seed we shall send you the greatest portion, when we have opened the canister, and taken out a little for some friends.

When writing the 1st April to Captain Cannon, on the subject of tobacco, &c., we were not aware of your having

received from Lieut. Ripley so large a quantity of Sandoway tobacco seed as you possess.

Further, as to the soils, it had been forgotten by the writer, that Mr. Piddington, in his very valuable communication on the soils suitable for cotton, tobacco, sugar, and the tea plant, (No. IX of Vol. III., p. 31, &c, of the Society's Transactions 1839), had already analysed the soils of Arracan, Singour, and Hinglee, shewing how superior the first was to the second and third, by containing so much as sixteen per cent of the reddish brown oxide of iron, known as the "peroxide;" it appearing probably, by analyses of the best cheroots,—that to the presence of this peroxide, the fine flavour and colour possibly of the best tobacco, such as Havannah, is attributable. However we do not regret at all having obtained such large samples of the soils so judiciously selected by Dr. Davies, and we hope that the Society may be induced to have each sample subjected to another careful analysis.

The samples having become *very dry*, probably look much less red than they do with the ordinary moisture in them. In No. 3, the peroxide of iron shews itself distinctly in several of the lumps, the ground probably being not usually disturbed below nine to twelve inches.

We beg you will place the muster of Kyoungree tobacco leaf, also the samples of the soils on the table of the Society, and we should be glad if you would cause to be placed on the table also any reports which our gardener, Mr. MacMurray, may have made, shewing his mode of growing, and especially of *curing*, three maunds of tobacco, for which we are pleased to find he has had purchasers at 10 Rupees per maund.

On the subject of this *much-neglected staple* of India, *Tobacco*, the writer hopes ere long to be able to make some further communication to the Society.

Calcutta: 16*th June*, 1854.

Extracts from a letter of Dr. J. Davies, Officiating Principal Assistant Commissioner, dated Sandoway, 30th May, 1854, to Messrs. Willis and Earle, Calcutta.

"I have the pleasure to send you per steamer samples of earth for analysis from the best Kyoungree tobacco plantation,—also 10 Rupees' worth of the best leaf tobacco from the same place. The latter was obtained with much difficulty, although at above twice the price it fetches early in the season.

"The seed also I hope you have received; it is usually sown just after the rains, often at a considerable distance from Kyoungree, in *rich clay soil*, and the seedlings of two months are usually planted out, and take four and a half months before the leaves are fit to pluck for drying. During the latter process, as well as while the leaves are fermenting, the Java method is pursued here in long sheds, by the Akyab house that seems most interested in the trade, but the natives only dry their tobacco, &c. This is considered the reason that it spoils so frequently on being kept long, or sent to England.

"*Kyoungree*, means *large river*, from being situated on the latter, and not on a smaller stream that exists to the south of it.

"In going to Kyoungree, I passed Talenzike, a village about two miles to the E. of the station of Sandoway, then came to Thown-She, *i. e.* Long Chur, a milè further, being three from the station, then to Ooyim Geen, about a mile further to the E., where the soil of the low hills appeared well adapted for coffee plantations.

"About one and a half or two miles beyond this, the best tobacco is obtained, the quantity being small, and places best suited for it, limited.

"I here tasted the water of the river, as it moved rapidly over the pebbles, and found it perfectly free from the saline influence of the tide, and the best spots of tobacco land

seemed to consist of a loose, rich, surface alluvial deposit, upon stiff clay soil. I am sorry it has not been in my power to visit Proashay, but the tobacco of that place is also considered very superior. The best informed natives say the flavour becomes weaker in proportion as the plants happen to be cultivated near the sea, and those while growing require more frequent watering.

"The paddy most frequently used here is the Yeen-nee, or red sort, and Nakrensie, or white; both are sown in June, sometimes broad cast, but most frequently in nursery beds, and planted out on higher ground.

"Black rice in small quantity is obtainable. It seems well adapted for hospitals, being very mucilaginous."

Remarks on various Specimens of Fibre suitable for Cloth, Cordage, and Paper manufacturing, forwarded by Dr. R. Riddell, *Superintending Surgeon, Hyderabad Subsidiary Force, and Corresponding Member of the Society: with a Report thereon by* Joseph Willis, Esq.

I did myself the pleasure of forwarding to you, a few days ago, specimens of fibre procured from several plants in my garden. Three of them, the plantain, pine-apple, and yucca, were sent more with the view that the others might be compared with them, as to color, strength, &c., than for the specimens themselves, and at the same time to enable the members of the Society, when they meet, to give an opinion how far they think it might be desirable that the plants yielding such fibre should be extensively cultivated.

No. 1. Fibre from the plantain leaf stalk, which, after being stript clean, was gently beaten, and then laid to soak in water for seven or eight days, after which it was taken out, laid on a block, and beaten with a round roller, sprinkling it with water, and ridding it of all its pulp and sap, it was then rinsed in clean water, and hung up to dry. Next day

it was dipped in water, and once more beaten. This was my second attempt to clean the leaf, having been able to make nothing of it in the way laid down in the *Indian Journal of Sciences*, published at Madras, in July, 1850. Since then I have tried various plans for cleaning the leaf, and have been able to produce a long fine, clean, light straw-colored fibre, by the following process. I first selected leaves from a plant in blossom, that were as free from being stained and withered as I could find, stript off with a knife all the green leaf from the central stalk, then laid it on its under surface, as when growing, on a flat block of a greater length than the leaf; it was then beaten smooth with a hard round roller, the upper and lower surfaces were then easily divided by the hand being passed between. The upper division was then turned and laid by the side of the lower, the pulp part of both being uppermost, it was then beaten, and the sap and pulp all easily removed, after which rinsed in clean water, and hung up in the shade to dry. The stalk of the plant, which when cut was of a pale white color, I had treated in the same way exactly, and the result was, not as I anticipated, a fine white fibre, but a darkish brown, deeper if any thing, than the sample sent you.

No. 2. Produce from the bark of the *Hibiscus esculentus*, (the Bayndie). This fibre, though coarser than the plantain, is much whiter, and I conceive might be made particularly available for the manufacture of paper, if not for other purposes, and as it is of quick growth, arriving at perfection in from twelve to fourteen weeks in the rains, and about the same time after, three crops could be raised during the year, and it strikes me the plant would grow during the summer months in England, and ripen in the autumn. The natives are fond of the vegetable it bears, and readily cultivate it, and the stem would only be required after the fruit had been removed. The produce of fibre from one plant was an ounce and a quarter, whilst the plantain leaf only gave three

quarters of an ounce. The mode of preparing the fibre was pretty similar to the plantain; the stem and branches being cleared of the leaves and shoots with a sharp knife, a slit was made along the stalk, for the purpose of dividing the bark easier; it was then laid on the block and beaten, when the bark immediately separated from the wood part, and was stript off, and the fibre cleaned like the plantain, only it appeared to be much quicker done, and so was the silky fibre from the Mŭddár, *(Asclepias gigantea)*, it was beaten out almost at once a pure white.

No. 3. Fibre of *Malope grandiflora*. Procured by the same process after the bark from the stem and shoots had been removed, and the leaf stalks, shoots, and capsules cut off, which has of course rendered the fibre short and uneven, a matter I conceive of no great consequence, if only required to be converted into pulp for paper. The *Malope grandiflora* grows readily in all kinds of soil, but if of a rich loamy nature will in the rains attain the height of ten or eleven feet, with numerous branches, and at the axilla of each leaf, the flower of a purple color makes its appearance, and nearly as large as the straw colored *Hibiscus cancellatus*. Should the plant not be known at Calcutta, I can supply any quantity of seed.

No. 4. From the *Yucca gloriosa*. This plant resembles the aloe in appearance, the leaves shooting from the stem with a hard sharp point. It is very common in all the gardens here, and is easily propagated by shoots or its tubers. The leaves from one plant, which had blossomed and been cut down, yielded two pounds and eight ounces of the fibre. No. 4 is a sample from the fresh leaf beaten out. No. 5 from leaves that had been soaked for ten or twelve days. The difference in color appears to be but trifling, and if it has not impaired its strength, it facilitates the dressing of the leaves in the proportion of three to one.

No. 6. Is some pine-apple hemp, prepared here nearly two years ago. After the fruit had ripened, the leaves were

washed, all the edges cut off, and then beaten as the plantain and others described.

No. 7. Is a small sample from a shoot only of the common hedge pink flowered Mallow, found growing by accident near the Bayndie, but which since sent to you, I perceive has been before proposed as one of the materials for the production of paper; nevertheless I shall be glad if, by bringing these plants to the notice of the Society, with the manner of preparing the fibre, it may induce those so disposed to make more successful experiments with the same plants, and extend their researches to others, and thereby assist in developing the resources of the country.

Bolarum: 23*rd September*, 1854.

In a former communication on the subject of "Indian fibres" I mentioned, when I sent you a few samples, that I thought paper might be made from the *Hibiscus esculentus*, known generally amongst the natives as an *Ambaru*. Since then I have found a manufacturer of coarse paper, who resides in the bazar, and have had a trial given to the hemp of the Bayndie, and which I since learn is to be bought in many parts of the Deccan from twelve to fourteen annas the maund of twelve seers, [1*s*. 6*d*. to 1*s*. 9*d*. for 24 lbs]. Here I had to pay one rupee eight annas, [3 shillings]. I inclose you a sample of the paper made from it, and although coarse, I am led to think the fibre if prepared with a little more care, and bleached, would produce paper of the best quality. I have fibre prepared under my own direction nearly white, but which I did not like venturing with the paper manufacturer, until I had seen the result from the bazaar article. The natives grow the Bayndie plant very generally, using the capsule when green as a vegetable, and never pull it up until it has done bearing, when it is pulled, and the leaves if remaining stript off, it is then soaked in water for a time, sufficient to loosen the bark from the

reed, beaten out and dried, the root part of the stem being allowed to remain, and this of course increases its weight to the purchaser. When I gave the hemp to be made into paper, I desired the root ends to be cut off, thereby decreasing by so much the quantity of material for the paper, although the man remarked it would make the strongest. My desire was to have as fine a paper as he, with his very limited means, could produce, (merely a wooden beater, a bamboo sieve or frame, and a small chunam lined tank or reservoir). He brought me first a quire as a specimen, and after one ream, size 20 inches by 18, weight 18 pounds, to which if added the previous quire, and the ends of the stalks not used, it shows little loss of material in the making of the paper from twelve seers of the hemp. My object being to ascertain the capability of converting the Bayndie fibre into paper, I allowed the man, as an inducement to do his best, to make his own charge, and his demand was three and a half rupees, [7 shillings]. From the strength and thickness of the paper, there can be no doubt, that with the aid of machinery, and the fibre better prepared, three reams of good paper might be made out of the same quantity.

I shall have the pleasure in a day or two to send you by banghy some sheets of it, also cloth made from the fibre of the *Agave cantula* (the aloe), and specimen of cotton grown here for the purpose of distribution, and if the Society would like to have a few pounds of the seed, it is much at their service.

Bolarum : 13*th February*, 1855.

Since my last of the 13th inst., I have had the pleasure to send you by banghy a small package containing the following mentioned articles, which oblige me by laying before the members of the Society at their next meeting. The cotton grown here appears of a superior quality, and as I have now raised it successively for three

years, it may probably have become acclimated, and should the Society desire some of the seed, I can spare five or six pounds, sufficient to make an ample trial with. The other cotton was also grown here, from seed brought by a friend from Madras, and I believe is originally from the Mauritius. The third specimen is indigenous from Berar, and merely forwarded, though good, for comparison.* A sheet or two of coarse paper made from the Bayndie, *Hibiscus esculentus*.†

Some specimens of cloth from the fibre of the aloe (*Agave cantula*), which may prove a novelty, and be by the Society considered worthy of a place in their Museum.‡

It strikes me if the fibre was spun, it might be turned to many accounts, particularly as a substitute for horse hair, in the manufacture of the part of feminine attire known as crinolines, also for shoes, sieves, similar to the Chinese, bags, for expressing oil from nuts, furniture brushes, being light and strong, and perhaps many other purposes besides cordage, lines for fishing and whip cord. In South America the coarse kind of aloe has always been applied to the

* These three specimens of cotton have been reported on by the Society's Committee to the following effect :—

No. 1. Raised probably from New Orleans seed, resembling as it does the cotton of that green seed, or short stapled variety. It is of good color, fine, soft and pliant, but weak in staple Its value in the Liverpool market about 4*d.* per lb.

No. 2. Raised probably from the Bourbon or black seed variety, fibre long, soft and silky, resembling the Sea Island cotton of the United States, though wanting, perhaps, in the vigor, strength, and complexion of the latter. A very superior cotton, nevertheless, would bring in the Liverpool market, as much as 1*s.* 6*d.* to 1*s.* 9*d.* per lb or even more.

No. 3. Indigenous cotton, grown at Berar, is a good specimen of its kind, and superior to the generality of country cotton, the staple being pretty long and free from that harshness of feel and want of pliancy so common in the cottons of this country, value about 3½*d.* per lb.

† These specimens have been forwarded to the Society of Arts, and to Dr. Royle, for report.

‡ These are deposited in the Society's Museum.

making of ropes, but the finer species which grow on the hills, is used for thread and various other purposes, and is called pita, so a friend informs me, and he thinks the fibre of the aloe here resembles the latter.

Forwarded by banghy.

Cotton of three descriptions, with two small parcels of seed.

Specimens of paper, two sheets made from the fibre of the Bayndie. Specimens of cloth made from the fibre of the aloe; also aloe and raw silk mixed; ditto, with tussah silk.

Bolarum: 23*rd February*, 1855.

With much pleasure I acknowledge the receipt of your favor of the 20th, conveying the thanks of the Society for my various contributions, &c., which were submitted to them at your last meeting.

You mistake as regards my having a finer description of paper made from the fibre of the Bayndie. I only said in my letter that I had "fibre from the *Hibiscus esculentus* prepared under my own directions, nearly white, &c." I inclose a small specimen, as it is very different from the Bayndie hemp, as prepared by the natives, particularly in its appearance, besides more is procured from one plant by my process than by the usual method of dressing it. The natives soak their bark for nearly two months, and then beat it out; whereas mine is not soaked for more than from 12 to 15 days. The bark, when fresh pulled off the stem, is cut in lengths of from 6 to 8 inches, and then soaked in a vessel of water, being well stirred and turned about as the pulp around the fibre begins to soften, changing the water two or three times, it is then taken out, and beaten with a round mallet on a block, dashing it with water during this process, after which it is washed and dried.

I found the fresh green bark of 40 stems to weigh twelve pounds, and forty pounds yielded three of fibre, which gives a little more than an ounce to a stem, the latter quantity may be taken as the average. As far as I can judge, the fibre so prepared by the natives is in the proportion of about 6 ounces to ten stems, therefore, if I am correct, my method of preparing the fibre, though a little more tedious, is compensated by the large increase in quantity, and apparently of a better quality for the manufacturing of paper.

I should be obliged if you would send me a small piece of the paper you have made from the plantain fibre. To me it appears that, the process of cleaning the stalk and stem of the leaf is too tedious and expensive to be in any way used for paper in this country, as I have never been able, with the greatest care, to procure from a whole plant seven ounces of fibre, and at the average cost of about Rs. 18 or 19 the cwt.; now the Bayndie fibre can be bought in the Deccan for three rupees the same quantity.

Bolarum: 31*st March*, 1855.

Report on the specimens detailed in Dr. Riddell's letter of the 23rd September, 1854.

No. 1. *Plantain Leaf Fibre.*—This fibre is very coarse, very uneven, very harsh, very weak, and very bad colour. It is of good length, being six or seven feet, but it is of very little value for any purpose, save for common paper making.

No. 2. *Hibiscus esculentus.*—I believe the Bengallee name—*Dharose.* This fibre is coarse, harsh, and rather weak, but of excellent color, and in fair condition; it is of good length, being from four to five feet. I think with the proposer, Mr. Riddell, that it would be found better adapted for the use of the paper-makers than for other more valuable manufactures.

No. 3. *Malope grandiflora.*—I know not this plant or fibre from any previous experience, but I find the *fibre*

to be very coarse, ligneous, very uneven, very harsh, weak, and bad in colour: it is also rather short, being only from three to four feet. Its value, whatever that may be, will, I think, be best found in the hands of the common paper maker.

Nos. 4 *and* 5. *Yucca gloriosa.*—This fibre is, I presume, from the leaf of the plant commonly known and denominated in Bengal "*Undafule.*" The fibre is about two feet long, and sufficient for machine spinning and manufacturing purposes. It is fine, round, even, and strong, with good colour and lustre. Moderately flexible, having a natural resistent harshness; and if it could be rendered more flexible, it would be very desirable.

No. 5. Having been steeped considerably more than the No 4 in its preparation, is thereby somewhat prejudiced in both its strength and its colour, as hinted at by Mr. Riddell. Perhaps the steeping process may be somewhat diminished and modified, so as to increase the flexibility without abating the strength, lustre, and good condition of the fibre.

I think well of this fibre, and that it is deserving of more extended experiments.

No. 6. *Pine-apple plant fibre of two years previous preparation.*—This fibre is about two feet to two feet six inches long, and is very sufficient for machine work. It is *very* fine, round, even, and also very strong and flexible, likewise with good lustre and condition, after a period of nearly three years since its preparation. I have never seen a production of this fibre before, but I think so highly of it, as to say that it is well deserving of more extended experiment, our soils and climate, generally speaking, being so favourable for the growth of this plant.

No. 7. *Common pink flowering Mallow.*—This fibre is stated to be from a shoot of the common pink flowering mallow. It is about two feet long, but coarse, uneven, harsh,

and weak. The colour and lustre very good. It resembles in general character the fibres of some of the several varieties of the *Hibiscus,* and, as I think, is better adapted for the uses of the paper-maker, than the machine-spinner and manufacturer.

I trust it will be perceived that Mr. Riddell is well deserving of the thanks of the Society for the interest he has taken in the subject, and the sensible and intelligible manner in which he has described the process adapted in the preparation of his specimens.

JOSEPH WILLIS.

Some account of the Chinese Potato, DIOSCOREA (JAPONICA) BATATAS.

[The Agricultural and Horticultural Society having applied to Mr. Robert Fortune, now in China, for tubers of the "Chinese Potato," it has been deemed desirable to publish the following interesting particulars regarding it, anticipatory of its receipt, with the view of affording Members desirous of giving it a trial, a fair idea of the character of so valuable a plant, and the mode of culture best adapted for it. It is probable that the plant in question can be easily naturalized in India. The first portion of the following series of papers is translated from *LeBon Jardinier*, for 1854, a very useful little work, edited by M. Vilmorin of Paris; the second is extracted from the *Gardener's Chronicle* for the 22nd July, and 23rd December, 1854, and the 13th January, 1855.—*A. H. B.*]

Since the potato disease has caused so much anxiety about its culture, attention has been more especially directed to different plants with feculent roots, which might, probably, supply its place. The tuberous sorts of *Oxalis*, the Olluco, the tuberous Capucine, the *Psolarea esculenta*, the *Apios tuberosa,* have each been successively studied, and present up to this time but little chance of furnishing a good substitute

for the potato; it will, probably, be the same with regard to the *Dioscorea Japonica.* Nevertheless, the introduction into our climate of a plant belonging to a family, which furnishes, in the tropical regions, so considerable a mass of alimentary matter, seems to us to merit some attention, as it would appear, unlike other plants of the same genus, that it can be naturalized, and brought to perfection in our climate.

The *Dioscorea Japonica* was received in 1850, in a collection forwarded to the ministry by M. de Montigny, the French consul in China. In the same year I received it from the Museum; but, guided by analogy, I have cultivated it in a greenhouse as a tropical plant. It was only in 1851 that I saw it would grow very well in the open air. Moreover, the vegetation of the plant being annual, and the roots acquiring in the course of one of our summers, sufficient bulk and maturity to be well preserved, the herbaceous and annual stalks might be destroyed with impunity by the frost, and the plant might be cultivated in the same manner as the potato or dahlia.

When set in the garden, the roots descend in a most remarkable manner. I uprooted one this autumn, which had descended the depth of more than a yard below the surface of the soil. The plant which presented this peculiarity had but one root, which measured in the upper part rather less than half an inch in diameter, but soon expanded in a cylinder, slightly enlarging from the bottom, to a diameter of rather more than an inch, and nearly a yard in length. We may conceive that, at this depth, the roots of the plant are quite sheltered from the frost, and that it might, consequently, be left entirely without fear of being destroyed by the winter,—and the more so as the lower part, swelling again from the root, is that which bears the greatest number of eyes or buds. This peculiarity alone shews that the *Dioscorea Japonica* scarcely answers to what should be sought for in a field plant. Moreover, its skin, although very feculent, is viscous, and more watery than that of the yams of the

colonies. On the other hand, this plant being very different in its mode of growth to any of those we possess (the *Tamus* excepted) will, probably, be more completely modified by our climate; and if, as was hoped by the flowering which took place last year at the Museum, that seeds might be obtained from it, it is probable, by means of these seeds, varieties may be procured in which the defects we have been describing may be modified or eradicated. L. V. 1852.

1853. We have but little to add to what we said last year about the *Dioscorea Japonica*. Nevertheless, the continuation of our trials has furnished us with some observations which we think useful to record here.

First, as to the eatable qualities of its root; it appears to us that cooking does away with the viscous appearance which renders its aspect so repugnant in a raw state ; baked, its skin is very feculent, light enough, and almost entirely deprived of savour, which we consider a recommendation in an alimentary plant. Another rather interesting point is the facility with which the stalks sprout: each knot of these long stalks may furnish a plant, provided they are grown in light and rather damp soil. The herbaceous development of the plant is very weak and tardy, and we are not able to report that it would grow in the open field. The produce raised from each plant, in a rich and deep soil is, on an average, half a kilogramme. If, as might be supposed from the weak development of the stalks, the plant can be cultivated in a small space, one might obtain a certain produce from its culture ; but the difficulty of uprooting it, from a soil like that in which we have tried it at Verriére's, would be equal to making a layer of soil of more than a yard in depth, rendering its cultivation impracticable in an economical point of view ; unless a species could be discovered, the roots of which would extent horizontally, or some process of cultivation which would destroy their tendency of striking downwards.

Among the valuable drawings of Chinese plants in the library of the Horticultural Society, is one of a dark rugged root, some 10 inches long, and 6 inches wide at the broadest end, of which nothing more is known than that it was obtained from the public vegetable market. There can, however, be no doubt that it represents a yam of some kind.

According to M. Stanislas Julien, as quoted lately by M. Decaisne, a yam, called Chou-Ya, or Tchou-Yu, Tou-Tchou, Chau-Tchou, Chau-Yo, &c., is universally grown in China. That of Nankin is the largest, and of excellent quality; another from the Chou country is still better. Its stems trail on the ground, the leaves are three-lobed; and in the autumn what are called fruits, but no doubt small tubers, appear among the leaves, and eventually drop off. This is perhaps the root represented in the place referred to. There are, however, many other sorts.

But the Chinese yams have attracted no attention in Europe. It is probable that they have been considered too tender, our notions of a yam being formed from East and West Indian reports. It seems, however, that one at least of the Chinese yams is as hardy as a potato, and likely to become a formidable competitor with the potato itself.

M. Decaisne tells us that the French experiments with a yam introduced from Shanghae, and called erroneously *Dioscorea Japonica,* justify the expectation that it will become a plant of real importance in cultivation. "If," says M. Decaisne, "a new plant is to have a chance of becoming useful in rural economy, it must fulfil certain conditions, in the absence of which its cultivation cannot be profitable. In the first place, it must have been domesticated in some measure, and must suit the climate; moreover, it must, in a few months, go through all the stages of development, so as not to interfere with the ordinary and regular course of cropping; and finally, its produce must have a market value in one form or another. If the plant is intended for

the food of man, it is also indispensable that it shall not offend the taste or the culinary habits of the persons among whom it is introduced. To this may be added that almost all the old perennial plants of the kitchen-garden have been abandoned in favour of annuals, wherever the latter could be found with similar properties; thus *Lathyrus tuberosus*, *Sedum Telephium*, and *Cirsium oleraceum* have given way before potatoes, spinnage, and the like. Now, the Chinese yam satisfies every one of these conditions. It has been domesticated from time immemorial; it is perfectly hardy in this climate (Paris); its root is bulky, rich in nutritive matter, eatable when raw, easily cooked, either by boiling or roasting, and then having no other taste than that of flour *(fécule)*. It is as much a ready-made bread as the potato, and it is better than the Batatas or Sweet Potato. Gardeners should therefore provide themselves with the new arrival, and try experiments with it in the different climates and soils of France. If they bring to their task, which is of great public importance, the requisite amount of perseverance and intelligence, I have a firm belief that the potato yam *(Igname-Batatas)* will, like its predecessor, the potato, make many a fortune, and more especially alleviate the distress of the lower classes of the people."

Testimony of this kind appears too important to be regarded lightly, and we are glad to second the recommendation of so judicious an experimentalist as M. Decaisne. When we consider how nearly our common black bryony *(Tamus communis)* is related to the yams, the probability of the new plant becoming naturalised among us receives further support. We would also suggest that all owners of ships trading with Shanghae, or other northern Chinese ports, should direct their captains to bring home a quantity of the yams exposed for sale in the markets. We know that there are many varieties, possibly belonging to more species than one, and it is deserving of enquiry whether

one may not suit the climate of Europe better than another.

The species described by M. Decaisne is called by him *Dioscorea Batatas,* or Igname-Batate, and is described as having much the appearance of the common Tamus. Its stems are annual, but its roots, or more properly speaking rhizomes, are perennial, and directed downwards perpendicularly, sometimes to the depth of a yard, if the soil is loose enough to admit them. The haulm is about as thick as a goose quill, cylindrical, turning from right to left, and about 2 yards long, violet, with small whitish specks. When left to themselves the stems lie flat on the ground, and strike root very readily. The leaves are opposite, heart-shaped, and triangular, upon purple stalks. The "roots" vary in length and thickness with the soil in which they grow. They may usually be compared to clubs, the blunt end of which is as big as the fist, but which tapers downwards till it is no bigger than the finger. Their skin resembles in colour the well-known beverage coffee and milk, and is covered with numerous fibrous rootlets. Under the skin is a white, opaline, very friable, slightly milky cellular mass, filled with flour, which softens and dries in cooking, till it acquires the taste and quality of a potato, for which it might be mistaken. Each plant may produce several of these roots, though in general there are only two or three.

M. Decaisne and his friends who have tasted this Yam think that no serious objection will be taken to the employment of it as food. The only question is whether a root which buries itself so deep in the ground will suit the habits of cultivators. It is not, however, easy to understand why, in Europe, the trifling mechanical difficulty of getting up such roots should be a hindrance, when the Chinese with their rude tools find the operation easy enough. In that country the yam is grown on a great scale. M. Montigny, who sent it to France from Shanghae, calls it *Sain-In,* and

says it is highly productive, the country people consuming it as largely as the potato in Europe. For propagation the smallest roots are set apart and pitted, to keep them from frost. In the spring the roots are taken out and planted in furrows pretty near each other in well-prepared ground. They soon sprout and form prostrate stems, which are made into cuttings as soon as they are six feet long. As soon as the cuttings are ready, a field is worked into ridges, along each of which is formed a small furrow, in which the pieces of the stem are laid down and covered with a little earth, except the leaves. If the weather is rainy, the cuttings strike immediately; if dry they must be watered till they do strike. In 15 or 20 days the roots begin to form, and at the same time lateral branches appear, which must be carefully removed from time to time, or the roots will not grow to the proper size.

These directions are simple and easy enough to follow; so that we see no reason why, as M. Decaisne remarks, the plant should not be perfectly suited to field cultivation. The crop would hardly be more troublesome than a crop of turnips.—*Gardener's Chronicle, 22nd July,* 1854.

An advertisement having appeared in our columns respecting a new esculent root called *Dioscorea Japonica,* it seems desirable to state what has up to the present time been ascertained respecting the plant. In the *Gardener's Chronicle* for the 22nd of July last, an account was given of a newly introduced hardy Chinese Yam, called *Dioscorea Batatas,* by Prof. Decaisne, which is identical with this *Dioscorea Japonica,* a name that, according to M. Decaisne, belongs to a very different species, and must therefore be abandoned.

Since the appearance of the account alluded to, a couple of plants were received by the Horticultural Society, and placed under the care of Mr. Thompson, who however failed

in inducing them to form tubers. Others have been more successful, especially M. Pepin, who in a late communication to the Imperial and Central Agricultural Society of France, gives the following interesting account of his experiments :—

"This plant arrived in a very bad state, nearly all the roots having been destroyed by the fermentation which had taken place in the box during the voyage.

"After the pieces of the roots which were sound had been cleaned and dried for three days, they were planted in well-drained pots, filled with sandy peat, mixed with about one-fifth of rotten dung, so far decomposed as to be reduced to the state of mould. The pots were plunged in a hot-bed, not covered by a frame, in order that vegetation might be accelerated by a gentle and steady bottom-heat; at the same time water was very sparingly given.

"At the end of a fortnight, by the aid of this artificial heat, fibrils and young stems had been developed. The plants were then taken out of the pots and planted in the open ground, in the end of May; a few were planted on an exhausted hot-bed, in order that they might take root more readily, and produce a greater number of roots and stems. These means succeeded perfectly well, and we were enabled to preserve and propagate the plant. The roots taken up in the autumn of 1850 were put into a cellar, where the frost could not reach them; and having kept well through the winter, they were planted out in the spring of 1851, in well pulverised, deep garden soil. The growth of the plants was very vigorous, and the roots attained a large size; one of them, measured in the autumn of 1851, was about 3 feet in length; its form was cylindrical and tapering.

"The stems of this plant wither every year in the end of October. The first year they were cut off soon after, and the roots taken up, under the impression that they had been injured by frost. The roots were in a growing state when taken up, and this led me to suppose that they might have

been left in the ground till the end of November, and that they would have attained a still greater size. I have observed, up to the present time, that the tubers were simple, and had no tendency to ramify; but I have also seen two together, of equal size, that grew from the lower part of the terminal shoot, and had their origin from the same point.

"In August, 1851, before the stems of that year were fully matured, some young shoots were taken for cuttings. They were cut in lengths of between 4 and 5 inches, and horizontally below an eye. They were inserted in pots filled with peat, and placed on bottom-heat in a hot-house, covering them for several days with a bell-glass, so as to completely exclude the air. These cuttings succeeded perfectly well. At the end of a month they had made a sufficient quantity of roots to admit of their being potted singly in 3-inch pots. They were kept in a hot-house, where they continued to grow till December. They had then pushed to the length of from 12 to 14 inches. Up to the present time cuttings made during summer from the herbaceous shoots have only yielded tubers after the lapse of from 14 to 16 months; but those raised from pieces of the roots produced tubers which could be used in the same year.

"It was doubtful whether the roots of this plant would withstand our winters, although some small pieces that were left in the soil when the roots were taken up in 1852 remained alive all winter, and made shoots from 13 to 19 inches in length during the ensuing summer; and the roots of one of these plants were as much as 14 inches deep. The roots which remained in the ground throughout the winter pushed their shoots about the 15th or 20th of April; those roots, on the other hand, which were planted in April did not exhibit shoots till the end of May, or more frequently not till the beginning of June. There is no longer any doubt as to the hardiness of the plants; they have withstood, as I have already stated, the 25° of frost which we have had this

winter, and when taken up the skin was smooth and fresh, and the roots altogether were in a sound state, as M. Brongniart, who was present, can testify.

"I preserved a root in a cellar from October, 1852, to the 30th May, 1853, without any appearance of the development of shoots. It was unchanged, and had not lost weight. I think the tubers may be kept nearly throughout the year, which is not the case with either the common or the sweet potato.

"In June, 1853, after having been seven months out of the ground, a root of this plant was analysed, in order to ascertain the amount of nutritive matter which it contained. The following was the result in 100 parts:—

Water, ...	70·40
Starch, ...	18·30
Alkaline phosphates (ashes), ...	0·78
Albuminous matter (a large quantity), saccharine matter (trace), cellulose, mineral substances, &c., ...	10·52
	100·00

"The proportion of starch was determined with the greatest possible care, but the quantity analysed was very small (463 grains); it would therefore be necessary to repeat the analysis with a greater quantity of the root.

"In a few years we shall know to what extent the roots left in the ground will acquire weight and bulk, and how long they may remain in the soil without deterioration of quality. We know, however, that a tuber taken up at the end of three years had its cellular tissue healthy to the centre, where it was also neither hard nor woody.

"From these facts I believe that this plant will be admitted among our cultivated tuberous species, and I am also led to conclude that it will be useful in an agricultural point of view, inasmuch as it remains several years in the ground like the Jerusalem Artichoke, requiring after planting little

or no cultivation, and finally that it will furnish, at all seasons of the year, an aliment within the reach of every one."

This report appears to establish the fact that the roots of the Chinese Yam are hardy and productive enough for garden cultivation. Of their quality we can speak from personal knowledge, a portion of a full-grown tuber having been obligingly sent us by Mr. J. Henderson, Kingskerswell, S. Devon, in whose hands, we understand, is the whole saleable stock of the plant. Boiled like a Potato, it proved extremely good, with rather a nutty taste, but it did not become mealy, although the Potatoes which were cooked with it were perfectly so; from which we infer that the roots require to be either steamed or roasted, if to be brought to table in perfection. At all events, it is certain that the Chinese Yam belongs to the first class of garden root crops. Experience only will teach the best way of cooking it, and, we may add, of cultivating it also. Upon the latter important subject we have the following practical directions from Mr. Henderson :—

"The manner in which the Chinese cultivate it is extremely simple. The earth is first formed into ridges, when small tubers or portions of large ones, are planted on the top, at about 3 feet apart; after the plants have attained a little strength, the shoots are spread over the sides of the ridges, and pegged down at the leaf end, 6 or 8 inches from each other (care being taken to cover the joints or parts pegged down with a portion of earth), when they soon strike root, and throw out tubers; by this means, immense quantities of roots, of the size of early-framed kidney potatoes, are raised on a comparatively small piece of ground. The above is the ordinary Chinese mode of culture; but to obtain them of a large size, small tubers, or portions, are planted on ridges, from 10 inches to 1 foot apart, and the plants are allowed to grow freely till late in the autumn, when the foliage is cut away and dried, or partially dried, and given to cattle; the tubers by this means attain on an average 1lb. and upwards in weight. The produce, when the ground is required for other purposes, is taken up and stored away for the

winter and spring; and it seems a peculiarity in this root, if exposed to the frost, it is not injured by it, nor does it have any inclination for sprouting till the natural season for planting."

Mr. Henderson further states :—

"That he finds a much quicker way of procuring a stock of young tubers for seed, by growing them in a cold frame, or on a gentle hot-bed, and taking the cuttings as soon as they appear; it being only necessary to cut off a leaf, with a small piece of wood without a joint, which is inserted in the mould (ordinary cutting mould) to the leaf—a pot of 6 inches diameter would contain about 50 cuttings—the pots should then be placed in a gentle heat, and kept close, either by means of bell-glasses or otherwise. Before the cuttings strike root they will throw out small tubers on the surface of the mould (similar to those sent out to the public); as soon as they are the size of a pea, they should be hardened off, and planted out thickly in the open ground, when many of the large ones will be fit for use the same season, if required. A good gardener, with a stock of 50 small tubers, ought to obtain from two to three thousand roots fit for the next year's seed."

There can be no doubt that the plant deserves the immediate and serious attention of all gentlemen's gardeners. —*Gardener's Chronicle, 23rd December,* 1854.

Since the account of the Chinese Yam *(Dioscorea Batatas)*, which we gave a few weeks since, a further report by M. Decaisne upon the result of last year's experience in France has reached us. It appears from this statement that the root has excited the greatest interest in that country, that it is already regarded as a sufficient recompense for the disasters which attended the potato disease, and that the public establishments are overwhelmed with applications for it from all parts of the country. The substance of M. Decaisne's statement is as follows :—

About the middle of April, when he considered the danger from frost to be over, he planted out in the garden of the

Museum of Natural History some pieces of the roots. Some were taken from the upper and smaller part of the tubers, others from the thicker part. The first were scarcely as thick as the little finger, and averaged $2\frac{3}{4}$ inches in length; the others were much larger, and formed slices or cross sections of a cylinder, each $1\frac{1}{4}$ to $1\frac{1}{2}$ inch thick on the edge. Three tubers weighing from $10\frac{1}{2}$ to 14 ounces were planted whole, in order to compare their produce with that of the cut sets. The plantation was made in an open border on the level, and not on ridges, as ought to have been done, a circumstance, however, which in no way affected the growth of the tubers; it only rendered the taking up difficult. The distance between the plants was $19\frac{1}{2}$ inches every way; this was another mistake, for, according to the judicious observations of M. L. Vilmorin, they should have been much wider apart. The short time which has elapsed since the introduction of the Chinese yam, prevents M. Decaisne's determining what may be called a good or a bad year for it; the future alone will show under what conditions of climate it best succeeds. All that can at present be said is, that in 1854 the growth of the plants was uniform, that their long twining stems grew vigorously, and were thickly covered with leaves, that abundance of flowers were produced (they were all males) about the beginning of August, and finally that vegetation ceased, and the leaves began to acquire a yellowish tint after the middle of September, thus indicating that the tubers had nearly come to maturity.

With the exception of some specimens kept apart for other experiments, all the plants were separated into three distinct lots. Two of these lots were staked—one with strong stakes 10 feet or more in height, the other with stakes 6 or 7 feet high. The stems twined round the stakes very regularly, in the same way as running kidney beans, and soon grew beyond them. In the third lot the plants were left unsupported, and their stems spread over the ground without

taking root, twining amongst each other; these did not nearly attain the length of those which were staked. In no case were the plants either earthed up or hoed, operations which did not appear to be required. The tubers were taken up on the 6th of November. The following return shows the results of the different modes of planting and cultivation which were adopted.

A. *Tubers planted entire, weighing on the average* 10½ *oz. each.*—Three tubers produced very vigorous plants, each of which formed one fresh tuber; two of these were enormous, and quite out of the common run, one weighing, when taken up, about 3lbs., the other 2lbs. 9 oz. The third was attacked by the grub of the cockchaffer, and only yielded pieces; its stems, moreover, withered in August. The tubers which had been planted were shrivelled without being much decayed or changed. Notwithstanding the size of the two new tubers obtained, this mode of planting is considered to be very objectionable.

B. *Plantation made with pieces of the tubers varying in length and thickness.*—Plants with stakes ten feet long. This lot consisted of 16 plants, of whch one produced two middle-sized tubers, weighing together fully 11½ oz., and which ought to be considered as only forming one. Weighed carefully three days after the tubers were taken up, and when dry and clean the following was the result:—

No.	Grammes.	No.	Grammes.
1	095	9	175
2	140	10	350
3	390	11	185
4	540	12	205
5	260	13	95
6	330	14	100
7	390	15	100
8	320	16	30

[Total 3 kil. 705 grammes, about 8 lbs. 2½ oz.; or a mean per tuber of 8 oz. $\frac{168}{1000}$.]

** Plants with stakes 6 to 7 feet high.

The plants, of which there were 28, also produced only one tuber each, of the following weights :—

No.	Grammes.	No.	Grammes.
1	40	15	550
2	50	16	270
3	55	17	380
4	195	18	370
5	690	19	270
6	550	20	265
7	520	21	220
8	790	22	230
9	540	23	225
10	420	24	355
11	420	25	55
12	440	26	165
13	450	27	210
14	765	28	175

[Total, 9 kil. 665 grammes, = 21 lbs. 4½ oz., or on the average 12 oz. $\frac{175}{1000}$ pertuber.]

*** Plants not staked, their stems straggling on the ground.

The number of plants was 13, and they gave the following results :—

No.	Grammes.	No.	Grammes.
1	488	8	245
2	475	9	150
3	460	10	140
4	488	11	120
5	400	12	110
6	495	13	55
7	290		

[Total, 3 kil. 916 grammes, = 8 lbs. 6½ oz., giving an average of 10 oz. $\frac{625}{1000}$ per tuber.]

The sum total of the produce of the three lots planted with pieces of tubers gives 17 kil. 286 grammes, or 38 lbs. 1¾ oz., as the produce of 57 plants, which is at the rate of rather more than 10½ oz. for the average weight of each tuber.

In this calculation the quantity of space on which the plants grew is not taken into account, nor would it have led to any useful inference, because as has been already stated, the plants were too far apart. But when he takes into consideration the perfectly tap-rooted nature of this plant; the shortness of the slender lateral roots, which are not more than from 3 to 3½ inches long; and moreover the large development of the stem and leaves, which clearly indicates that the plant lives principally on elements dissolved in the atmosphere, M. Decaisne infers that at the distance of 10, or even 8 inches every way, the plant would have sufficient space for its proper growth. There would thus be from 16 to 25 plants in a square metre. Taking the 20 plants to produce on an average each 10½ oz. of tubers, we have about 13¼ lbs. per square metre, or a total of about 23 tons 17 cwt. of tubers per acre. This is double the average weight of potatoes produced in France on the same space of ground.

So large a produce M. Decaisne admits to be entirely hypothetical, and calculated for the best conditions of soil and temperature, in the climate of Paris; it is also made upon the supposition that the whole of the ground is occupied. But although the computation may be too high, and notwithstanding that the Chinese yam costs more to plant than the potato, M. Decaisne has nevertheless arrived at the conclusion that the produce of the *Dioscorea Batatas* will exceed that of the potato, and that the greater difficulty in taking up will be compensated by the greater amount of nourishment which the tubers contain. It is in order to diminish the labour of taking up that he recommends the Yam to be planted on ridges, following as much as possible the Chinese method described in our former article. The reasons upon which this opinion is formed are the following:—

The tubers of the Chinese yam were in general from 13¾ to 19½ inches long; seldom more. The upper third is small, perhaps as thick as the little finger; this is, in his opinion,

the only part that should be kept for planting, and, in most cases, three or four slices, large enough to form vigorous plants, may be obtained; the rest of the tuber may be used for food.

It is important that the entire tuber should be taken up, especially since its lower extremity is always the largest part, and that which is richest in starch. By laying out the ground in ridges or narrow beds 10 or 12 inches high, the gardener has only to dig a spade's depth in the side of the ridge or bed, in order to reach the lower end of the root; and by turning over the ridges, so as to level the ground at the same time, the crop may be taken up without difficulty. It is evident, indeed, from what has been stated, that if the sets are planted sufficiently close, the labour in taking up will not be greater than that required for the same weight of potatoes. M. Decaisne hesitates to settle positively the breadth of the beds, or the distance from ridge to ridge; but he suggests that a space 20 inches broad planted with three rows of yams would answer very well. The furrow or space between the beds should not be more than a foot wide —just enough for a man to work in. He adds that the plants should not be staked, because their stems if allowed to spread over the ground preserve its moisture; and also because they may be made to root by a sort of layering similar to that practised by the Chinese, who by that means obtain a considerable increase of produce. This mode of layering is described in our former articles.

It should be understood that M. Decaisne only speaks of light free soils, and not of those which are compact and harden much with the action of the sun. The former are, in fact, those in which the may succeeds best. In China it is exclusively grown in sandy soils where few other green crops thrive.

M. Decaisne regards the Chinese yam as superior in quality to the potato. Although no comparative analysis of

the two has been made, he believes that the Chinese yam is much the richer in point of nutritive principles. Its roots are white as snow in the interior; they neither contain visible fibres nor tough woody matter, and when boiled they become so soft that a slight pressure converts them into a paste, which he can only compare to that of the finest wheaten flour. Cooked by steam or roasted, they look and taste like the best potatoes. They have one advantage, which every one will appreciate, namely, the short space of time required for cooking. Two pieces of tubers, of the size of a hen's egg, one the Chinese yam, the other the *Batate blanche*, were both put into boiling water at the same time with a Dutch potato of the same size; the first and second were done in ten minutes, the third in 20 minutes. And we must recollect that the facility with which the potato may be cooked is one of the causes which have greatly contributed to the popularity of the potato in a culinary point of view, as it requires but little fuel.

Another point of great importance to cultivators is that it may be kept easily for a year, and perhaps longer. We all know that the potato is certain to sprout in spring. The Chinese yam is wholly free from this disadvantage; it is neither affected by cold nor heat, and perhaps not even by moisture. Left in the ground, it remains alive through the winter without injury, as has been proved by a root which passed there the last severe winter, and pushed freely in spring; so that it is a hardy plant in the widest acceptation of the term.—*Gardener's Chronicle, 13th January,* 1855.

Notice of various Fibrous Materials: Flax from the Punjab; Basts from Burmoh and Arracan; Sida rhomboidea from the Society's Garden; and Asclepias tenacissima from the Midnapore district.

Since the publication of the last number of the Journal, several specimens of fibrous materials have been submitted to the Society. The receipt of these specimens, with some information respecting them, were duly recorded in the proceedings for 1854. But it is, nevertheless, considered desirable to re-introduce in this place, with the view of giving them greater publicity, the following particulars regarding such of these fibres as are deemed to possess more than ordinary interest:—

I. Fibre of the Flax plant, *Linum usitatissimum*, raised in the Garden of the Agri-Horticultural Society of the Punjab and received in June, 1854, with the following letter from Henry Cope, Esq., Secretary of the Society:—

"I have the honor to forward herewith a small sample of flax prepared in the Garden of the Agricultural and Horticultural Society of the Punjab, from plants reared from seed supplied from Saharunpoor under the name of Russian flax seed. It has been prepared by Corporal Kennan, of H. M. 10th Foot, a native of Monaghan, conversant in the manufacture of flax, but is coarser than it might otherwise have been, in consequence of our finer heckles not being ready. It is very desirable to obtain an early opinion of this sample, and the Society will be greatly obliged by your obtaining one as soon as possible. I may add that the produce was 6½lbs. of this quality from the twenty-eighth part of a beega, that there was besides 8lbs. of tow and 8lbs. of seed. The man who prepared it, considers it equal to Egyptian flax. In this country the people consider the seed alone sufficiently remunerative to induce a cultivation on a small scale."

The specimen was referred to the Flax and Hemp Committee of the Agricultural and Horticultural Society of India, and two of the members reported on it as follows :—

Mr. Stalkartt writes :

"This flax is decidedly the best specimen of this country's growth, and I should say a good merchantable article. It is very difficult to give a thorough report upon it, as we have none from Europe to compare it with. From the test it did not appear very strong, and from its smell I should say that oil had been used in the preparation. Perhaps with an improved method, it would have greater strength, as oil, generally speaking, deteriorates greatly the strength of hemp and flax. I would like to see it in greater bulk ; a handful is not a fair sample."

Mr. Haworth reports :—

"On the whole I think the preparation of this fibre does great credit to Corporal Kennan ; any short coming is owing to the finer heckles not being ready. I think the length of fibre is good ; the color of the greater part is bright and healthy, and that portion shews good strength. There is however a small part of the sample of a dark dull color, which I think is caused by over retting, and that portion of the sample is, as might be expected, weaker than the rest.

"If the natives of this country could produce such flax as this specimen under notice from the immense fields now grown in Bengal for seed only, what an enormous amount would be added to the value of our exports. I would suggest that Mr. Cope should be asked to send us a small sample of the seed like that from which this plant was grown, as well as some of the seed which the plant itself produced,—also to ask him to detail the process of retting, and the time taken in separating the fibre from the woody part. If a small quantity of the dried plant could be sent here, it might be tried both by the warm water process of Mr. Schenck, and the high-pressure steam process of Mr. Watt."

Mr. Haworth's suggestions were brought particularly to Mr. Cope's notice, but the Society have not heard further from him on the subject. The Society have, however, adopted the latter suggestion in another form, having recently (May, 1855) forwarded to the Chamber of Commerce, Dundee, a bale of flax straw, raised at Allyghur, from native seed, and grown after the native fashion, to be tested by the new processes. For this straw, they are indebted to C. Gubbins, Esq., of the Civil Service, one of the oldest and most zealous members of the Society. It may be mentioned, before quitting the subject of the Punjab flax, that a small quantity was made up into "log-line" by Messrs. W. H. Harton and Co., rope-makers of this city, for the purpose of having its qualities tested at sea. Capt. Tregear, of the screw steam-ship *Formosa*, to whom the line was sent for trial, reports it as superior to any before supplied. He adds "it has been in continual use during the voyage to China, and is still (January, 1855) good. The log-line before supplied has generally worn out after 10 or 15 days' use."

II. The *Basts* of Burmah and Arracan. The Society having received in June, 1854, through the Government of Bengal, copy of a despatch from the Court of Directors, with a report from Dr. Royle on the subject of Indian substitutes for Russian bast, (see p. 8 of this number of the *Journal*), a communication was made to Major Phayre, the Commissioner of Pegu, who superintended the selection of the Arracan specimens for the Great Exhibition, for some further information on the subject. Major Phayre was kind enough to send, in reply, two specimens with the following memo. on the Bast produced in the Province of Pegu:—

"This substance, termed by the Burmese Shaw, is obtained from the bark of three different trees, stated by Mason, in his notes on the botany of Burmah, to "belong

to the genera *Hibiscus, Paritium* and *Sterculia.*"—It is used by the Burmese extensively for cordage.*

"I send two specimens of the Bast, containing each about one maund. That marked No. 1 is termed Shaw Nee, or red Shaw. That marked No. 2 is called Shaw Phyoo or white Shaw.

The price of each specimen was Rupees 4-6-0. This is about double the ordinary price, because during the rainy season people do not readily enter the forests to collect the material. It is generally brought to market in the state of the specimens now sent, being cut into short lengths for the convenience of carriage. It might, without difficulty, be procured of any length up to 40 or 50 feet.

During the months of December, January, February, and March, I believe, it would not be difficult to procure in Rangoon, or its vicinity, two or three hundred tons of this material."

Mr. Willis, a member of the Flax and Hemp Committee, to whom the above two specimens were referred, thus writes regarding them :—

"I have had no experience in this vegetable bark and fibre. Speculatively considered, it seems to me suitable, primarily speaking, for mat-makers. Secondarily for cordage makers, and thirdly, perhaps for paper-makers. But for any of these purposes it has yet to find its value both here and in England, from trials of its utility in each department. It would seem that the Burmese apply it as far as is yet known only to the purpose of making cordage. If Major Phayre could send us specimens of the various Burmese cordage derived from it, with any information as to the process of its main plantation, it might be valuable to our Society.

* In a letter forwarding this memo., Major Phayre states that he has never heard of this material being used by the Burmese for making mats.

I perceive that on moistening it, and freeing the fibre from its vegetable pulp, that it has multitudinous subdivisions of a fine nature, each possessing moderate strength.

Inasmuch as the specimens now presented shew great tenacity, toughness, and flexibility, I should deem the article well suited for making bast mats, of which a large use and consumption is found in England.

In preparing it for this purpose, I would suggest that the bark, whilst green, be slit up into thin strips, of as long lengths as the trees will admit, and that the strips be made of various good widths, and be then folded up in lengths convenient for exportation."

Mr. Stalkartt, another member, observes, "I have seen this bark before, and have a small quantity, which is now being made into a double thread like coir yarn. It is very strong, and if made into threads, double, like coir yarn, would, I have no doubt, be extensively used for running rigging."

Mr. Stalkartt has since reported that the women whom he employed found it so stubborn, that he could not get them to make up a sufficient quantity for a rope.

Shortly after the receipt of the Burmese specimens, the Society were favored by Capt. F. W. Ripley, Principal Assistant Commissioner of Arracan, with sundry specimens of shaws or basts from that Province, as detailed in the following letter, dated from Akyab, 4th October, 1854:

"I have sent up by the *Fire Queen*:—

2 bundles Shaw Nee,
1 ,, Batharan Shaw,
1 ,, Thenban Shaw,
1 ,, Shaw Phroo.

A small bundle Nandzoung Shaw; do. Gyee Kywot Shaw, with a piece of rope attached to each of the latter.* The

* These two specimens did not reach the Society.

Nandzoung Shaw and Gyee Kywot Shaw are very strong fibres, being made from some of the creepers that abound in the jungle. The hill tribes use them principally for nets, &c., to snare wild deer, &c. The others I described in my letter to Mr. Blechynden in 1852, and gave full particulars as to the price, &c."

In the letter referred to, as written in 1852, which is published in the *Journal*, Vol. VIII, p. 147, Capt. Ripley describes both the Shaws,—Nee and Phroo,—as "large trees, which grow in all the jungles of Arracan, to the height of 30 feet or so, in girt about 24 or 27 inches; the bark is stript off, soaked in water, and treated the same as jute. From the fibrous material a strong rope is made by the Mhugs. The raw material is procurable in the Akyab bazar for about Rs. 2 the maund. The Batharan Shaw is the same as the other two, but is scarce, and not procurable in any quantity. I have never seen this for sale in the bazar."

Mr. Stalkartt reports that the Thenban Shaw is not of such good quality as that found in Assam and Burmah, and also in America. The Batharan Shaw, he is of opinion, would answer for watling for houses.

Mr. Haworth (another member of the Fibre Committee) observes that the Thenban Shaw appears like a coarse kind of Russian Bast, and he thinks it might be used for making various kinds of matting, and bags for paddy, and for other rough produce.

In December following, Capt. Ripley sent further specimens of Bast, and also some jute, with a communication of which the following is an extract:—

"I have by this steamer sent 8 bales, containing further specimens of the fibres of the Province.

1. Thenban Shaw, the bark of a shrub 7 or 8 feet high.

2. Are two kinds of jute from the Lémroo River country, in the Akyab district. The Heng Shaw is eaten as a vegetable.

3. Shaw Nee or red Shaw; Shaw Phru or white Shaw.

4 and 5. Gyee-gywot-Shaw, the fibre of a creeper used for nets and boat cordage, and for other purposes.

5, 6, and 7. Gnandzoung Shaw.

8. Dhau Shaw, the inner bark of a tree about 30 feet in height. This is very scarce.

The others are procurable in the dry weather, after some short notice, but I am afraid that the present method which the Hill tribes use of collecting the barks Shawnee, Ṣhawphru, and Batharan Shaw, of which I sent specimens previously, will render the supply very uncertain. They cut the tree down, to render the operation easy, thus preventing any further crop in the ensuing year.

The stripping the tree does not, if carefully done, kill it, but as they are only found in the heavy jungles, no regular stop can be put to the practice."

It will be seen from the letter of Mr. Gordon (*ante* p. 10,) that he thinks highly of the specimens of Shaws which were sent for his inspection, viz. the Shaw-phru, and Patha-you-Shaw; that they will prove when made into mats excellent substitutes for Russian mats, being very strong, pliable, and tough, when wetted, and easily divided into small portions, for the purpose of tying, &c., and entirely free from knotty places. We take the following description of certain specimens of Arracan Bast which were sent to the Great Exhibition, from Royle's *Fibrous Plants of India;* it will answer also for those received from Capt. Ripley :—

"*Thenban Shaw.* Coarse-looking, and of a reddish-brown colour, but divisible into a number of very thin layers, with a good deal of flexibility, and some toughness.

Pa-tha-you Shaw, [probably Capt. Ripley's *Batharan Shaw.*] Strips seven feet in length, and fine in texture, light-coloured, formed of several easily divisible layers: the outer layers rather dense and compact, and the inner cancellar. A *Musæ* species (?)

Shawphyoo [*Shawphru* of Ripley.] Long, thin, smooth layers; light-coloured, tough, and flexible; easily divisible into still finer layers.

Shaw-nee, of a reddish brown colour, rough and coarse, best twisted into rope.

Eee gywot Shaw, [Gyee-gywot-Shaw of Ripley] Strips 5 to 6 feet in length, composed of several layers; of which one side is smooth and compact, but the layers on the other side thin but cancellar, all having a considerable degree of toughness."*

III. Fibre of the "Suffaid Bareeala" of Bengal, *Sida rhomboidea,* Roxb.: the produce of the Society's Garden.

In 1851, Major Hannay forwarded to the Society a sample of the fibre of *Sida rhomboidea,* from Upper Assam, which was most favourably reported on, (see *Journal,* Vol. VIII, p. 62.) In July, 1853, Major H. sent the Society some seed of this plant, which was sown in the garden immediately on receipt. The plants produced by that sowing ripened

* While this paper is passing through the press, we have met with the following notice respecting the applicability of shavings of the Bast for paper making. It is published in *Chambers Journal of Popular Literature, Science and Arts,* for May, 1855, under the head of late inventions and projects in America:—

"The growing scarcity of rags for paper making has latterly pressed on the American as well as the English publishing world; and in the States, as here, a variety of articles has been suggested to supply the deficiency, the most successful of these seems to have been the pulp made from shavings of the bass-wood. The bass is a comparatively valueless wood, having hitherto only furnished the thin strips of bass of which the common kinds of mats are formed. The discoverer is Mr. G. W. Beardslee of Albany, State of New York, where a number of a newspaper, according to late accounts, was printed on paper made entirely from bass-wood. The pulp is said to be manufactured cheaply, a matter of the first importance, for the real difficulty in the way of such discoveries is the cost of preparation. The Albany *Evening Journal,* the newspaper employing bass-wood paper, speaks approvingly of Mr. Beardslee's discovery, and appears to think that the question of a substitute for rags is at length practically set at rest."

seed in the following November. This seed was sown in June, 1854, and the above fibre was obtained from it in October. The following are the reports of two of the members of the Society's Hemp and Flax Committee :—

"The fibre from Major Hannay, of Upper Assam, appears to have been reported on in the 8th Volume of the Journal now not before me, but I have some recollection of a favourable report having been made upon it ; and I perceive now, that time and age, being three or four years ago, have impaired both its strength and colour.

I have now to report on the specimen from our Gardener Mr. McMurray's growth and preparation.

I find it of excellent length, being about ten feet. It is very completely freed from all ligneous adherents, and is in excellent condition, having its silvery brightness or lustre and colour in high perfection.

The fibre is remarkably round ; it is also fine, being somewhat coarser at the root end than in the upper parts, and near the top extremity it becomes exceedingly fine.

The strength, although inferior to some of the best *or strong* fibres, which have been before us, is nevertheless excellent.

I consider this fibre worthy of the best attention of those who may be engaged in vegetable fibrous productions, and more especially so, as it seems capable of being grown so well in Lower Bengal.

Our Gardener, Mr. McMurray, would no doubt be able, on call, to give all needful information as to its culture and preparation, and if he were requested to place some minutes of his treatment of the subject before the Society, its publication might be found very useful, and with this view I make the suggestion.

JOSEPH WILLIS."

"I have given a careful examination to the specimen of Rhomboidea fibre, grown and prepared in the Society's

garden. It is really a very nice, and in my opinion likely to be a very useful fibre, it is good colored, bright and strong, and a fair length, and I think it might be put to very many useful purposes by a manufacturer accustomed to work up jute; it is so like the better qualities of this latter article, but more silky, that a manufacturer could make a fair trial of it, without the great inconvenience of altering his machinery, and which is a great matter in the introduction of a new article.

I should wish to see some quantity of it prepared and sent to some of the Dundee spinners for trial and report thereon.

W. Haworth."

Following out the suggestion of Mr. Willis, we introduce a brief notice from the Society's Gardener on the cultivation of this plant and preparation of the fibre. The suggestion of the other member (Mr. Haworth), has also been carried into effect, by the despatch of a bale of the fibre to the Chamber of Commerce at Dundee:—a smaller specimen has likewise been sent to Messrs. Marshall and Co. of Leeds.

Dr. Roxburgh mentions *(Flora Indica,* Vol. III. p. 178), that one species of this genus, *Sida abutilon (*now *tiliæfolia),* is cultivated in the neighbourhood of Pekin, under the name of *King-ma,* as a substitute for hemp and flax; seeds were received from China by him, and sown in the Botanical Garden, at Calcutta. Dr. Royle informs us *(Fibrous Plants of India)* that seeds of the same plant were received a few years ago by the Horticultural Society of London, and he saw a fine crop of the plants in their garden at Chiswick, which seemed about eight feet high.

"The *Sida rhomboidea* fibre-yielding plant, cultivated in the Society's Garden in 1854, was sown on the 16th May, previous to which the ground had been thoroughly ploughed and harrowed three times and well cleared of the weeds. The seed was then sown broad-cast, as the object was to pro-

duce a thick crop of plants, standing close together, to grow up into straight stems, without branching, which is better adapted for the production of fibre: the treatment of the crop was afterwards confined to careful hand-weeding, which took place when the crop had attained three or four inches high: no more labour was required until the crop was fit for cutting, in September; at that time it was cut close to the ground by coolies, who used small hand sickles for that purpose. The stalks when cut were laid down in handsfull on the stubble, and then put into heaps and strawed over with grass rubbish, for the purpose of causing fermentation to take place in the leaves, which occurred in the course of four days. At that time the crop was sorted, the small and large being tied up separately in handsfull; of these handsfull from fifteen to twenty were bound into three feet girth sheafs, and then put into the steep, the buttend of the sheaf was placed next the side of the tank, and loaded with brick, merely to keep the whole below the surface of the water. The object of tying the stalks up in handsfull, previous to sheafing, is, that at the time of washing, they separate one from the other without any trouble or injury to the fibre.

The length of time the fibre took in the steep was twelve days. At that time it was separated from the pith by coolies standing in the water, previous to which they had been furnished with small hand mallets, to beat the fibre and stalks lightly, in order to raise the fibre from the pith; they then broke the buttend of the stalks one foot in length, and shook that portion of the stalks into the water, after which they cast that portion of the cleaned fibre round their right hand, and jerked the remaining portion from the pith in the water; part of the water was wrung out of the fibre previous to casting it on the grass bank, where a man was stationed to pick up the fibre, and hang it over a bamboo line or frame work, which had previously been erected to dry the fibre upon.

The only other work done was perfectly drying the fibre in the sun.

In conclusion, I have to remark, that the ground on which this fibre was grown, was of a gentle sloping nature, the lower end of which consisted of a heavy clay soil, and that at the upper end of a sandy loamy texture; on this part of the ground the plants grew from four to five feet high, whereas at the lower, the plants were stunted, and did not grow more than two feet high."

IV. Fibre from a creeping plant, commonly found in the Midnapore district, presented by G. F. Cockburn, Esq., C.S., at the general meeting of October, 1854.

This specimen was also referred to the Committee who reported as follows:—

Minute by Mr. Willis:—

"In these specimens a fibre of remarkable character is presented to us.

Its length is not great, varying generally from one foot to two feet, and averaging probably about twenty inches.

It is fairly round in its structure; moderately flexible; possessing a degree of resistant harshness, which might probably be abated with a very little more steeping or washing, and then without diminishing in any objectionable degree either its strength or brilliancy.

It is of good fair fineness, and by beating or dressing may be rendered still more fine, inasmuch as its presently presented fibres, are capable of subdivision; but this had perhaps best be left as a future work, for the preparative spinner, unless it could be more easily and cheaply effected here during the greater greenness of the fibre.

Its colour is excellent, being silvery with a slight tinge of drab.

Its length is quite sufficient for all purposes of machine-spinning, &c.

Its great merit seems to be in its most remarkable strength.

It is desirable indeed that we should acquire more knowledge of the plant, its localities, and habits, &c., &c., and that we should ask this of Mr. Cockburn, with any other information in regard to its preparation which he may be able to give."

Minute by Mr. J. Stalkartt :—

"I agree in all that Mr. Willis has stated, but should like something more than a sample,—viz., 10 mds. It is not of sufficient length to be quickly spun by hand. Therefore not fit for rope, but might do for lines."

Minute by Mr. W. G. Rose :—

"I concur in Mr. Willis' report, and think with him that we ought to acquire more knowledge of the plant, and the mode of preparing the fibre, and cost of production, which Mr. Cockburn will no doubt be kind enough to furnish us with."

Since the above was written, Mr. Cockburn has sent a few living specimens of the plant yielding the above fibre, and it has been recognized to be the *Asclepias tenacissima* of Roxburgh, the "Jeetee" of the Rajmahl hill people, of which they make their best bowstrings, that last for five years, though exposed to all sorts of weather. Roxburgh gives the following account of the mode of preparation, &c., in his *Flora Indica*, Vol. II, p. 52:—"During the rains, they cut the shoots into lengths at the insertion of the leaves, peel off the bark, and with their nails, or a bit of stick on a board, remove the pulpy part. A person accustomed to this work, will, I am told, clean as much as six pounds of the fibres in one day. These fibres, and those of the bark of the Malay plant "Battang-cullooee," or "Poolas," (*Urtica tenacissima*, Roxburgh) are by far the strongest fibres which I have met with in the vegetable kingdom, far exceeding those of the leaves of my *Sanseviera Zeylanica*. A line made of common hemp for a standard, broke with 158 pounds when dry, and 190 when wet; the average of several trials. A similar line of this

substance broke with 248 when dry, and 343 when wet, while one of "Battang-callooee" broke with 240 when dry, and 278 when wet."

In 1844, the Society received specimens of the same fibre, from Mr. C. B. Taylor of Palamow, whose communication, together with a report on the strength of rope made from it, in comparison with other fibrous materials, will be found in Vol. III. of this Journal.

A. H. B.

Selections, &c.

On the Natural Law by which Nitrate of Soda, or Cubic Saltpetre, acts as a Manure, and on its Substitution for Guano. By the PRESIDENT.

Though the plain path of practice is in agriculture generally the safest, it will not be useless for that very practice sometimes to deviate into theoretical considerations, the result of which may render the steps of experience more sure; just as the sailor, while buffeting with a stormy sea, ascertains his course by the abstruse calculations of the astronomer. Such a field of inquiry is, I believe, presented to us in the use of saltpetre as a manure.

This substance, or rather these substances—as there are two, the ordinary and the cubic saltpetre—consist of an acid, the nitric acid, and an alkali, either potash or soda; nor could any one, viewing the effect of these individual salts, decide whether the acids or the alkalies were the source of their manuring action. Looking, however, to the nature of other fertilizing matters, I ventured, so long ago as the year 1841,* to express the belief that their power would be found to reside, not in their alkalies, but their acid. Still the arguments then adduced were not thought conclusive, and in books subsequently published † it was yet said that the potash and the soda very probably were the manures, for the mineral theory was still in vogue.

Last year again, having some fresh facts to bring forward on nitrate of soda, I endeavoured to support the same view by showing further that other nitrates also, such as the nitrate of lime found in old walls, have likewise a manuring effect.

Still the question has remained open, and the highest chemical authority in Edinburgh has recently questioned the manuring power of nitric acid; nor can any one blame that distinguished philosopher, Dr. Gregory, for exercising caution in admitting such an hypothesis. For if it be true that all substances containing nitrogen, in whatever form, are thereby constituted manures, this will not be a mere rule of farming, but an important law of vegetable physiology; the more important, perhaps, because we hardly know any other law under which vegetables acquire their substance, excepting that by which they absorb carbonic acid in day-light. Indeed his opponent, Dr. Wilson, in an able paper‡ read before the Royal Society of Edinburgh last spring, advocated the efficiency of nitric acid with some hesitancy, admitting that "soda might be the more important constituent of nitrate of soda considered as a fertilizer." So long, then, as the productive power of nitric acid rested upon abstract reasoning, however cogent, the general law

* Journal of Royal Agricultural Society, Vol. II. p. 123.

† "Both Nitre and Nitrate of Soda are used as manures, and it is still uncertain whether the acid of these salts contributes to the good effect, or whether they act by their bases alone."—*Outlines of Chemistry*, by O. Gregory, M.D.

‡ Transactions of the Royal Society of Edinburgh, XX. 41. read April 18th.

could not be regarded as finally valid. It appeared, therefore, desirable to bring the matter to a decisive experiment, and by employing the two elements of nitrate of soda, the acid and the alkali, separately, to ascertain in which of the two the manuring virtue is seated. It would be scarcely possible, of course, to use nitric acid upon acres of land, nor did it seem necessary, for we know the vivid green and the rapid growth induced upon grass by nitrate of soda. Whichever, therefore, of its two elements used side by side with itself, the alkali or the acid, produced the same vivid green and the same rapid growth, must clearly be the active principle of the combined salt.

In applying nitric acid for the first time as a manure, whatever confidence one might entertain in a scientific induction, one could not see the most powerful of acids eating away the very spoon which held it, or feel its acrid fumes in the lungs, without some misgiving as to its action upon the tender spongioles of the grass's roots. Considerable dilution was of course necessary, and the first point to be ascertained was the amount of water required to be mixed with the acid for the safety of the living fibres. Six stripes, then, each five feet long and one broad, having been marked out by pegs upon a grass-plot, these received severally from a watering-pot a pint and a half of water containing nitric acid, the proportion of which was successively decreased. Two other stripes also received nitrate of soda in different quantities. The three strongest doses of nitric acid had burnt up the growing grass by the following morning, but, to my great satisfaction, in about a week the next stripe showed unequivocal marks of benefit from the nitric acid. Soon after, one weaker solution had begun to act. It was only the weakest dose of all which produced no effect. The three strongest too had killed the blades alone of the grass, not the roots, which in about a fortnight sent up a new crop of deeply discoloured herbage, resembling that produced on their side by the nitrate of soda. The quantities of acid applied are given in the following Table :—

September 22.

Manure employed on area of 5 square feet.	Quantity in Drachms.*	Water in Pints.	Effect on Grass, perfection being taken at 10.
Nitrate of soda	6	1½	10
Ditto	3	..	9
Nitric acid of commerce ..	8	..	8
Ditto	6	..	8
Ditto	4	..	8
Ditto	2	..	8
Ditto	1	..	2
Ditto	0½	..	0

* The drachms express, of course, the *weight* of the dry salts and the *measure* of the liquid acid.

At this time, November 15th, the effect of the waterings is still very conspicuous, the grass so treated being not merely darker but thicker, and three times longer on the best lots than on the adjoining turf.

Having thus discovered that nitric acid did act, and having ascertained the safe dose, I made two further trials, which included the alkalies separately, soda and potash, and also included ammonia to serve as a further test. In both trials the nitric acid acted decidedly. The alkalies, neither of them, produced even a trace of effect on the colour, or on the growth of the grass :—

October 3.

Manure employed on area of 5 square feet.	Quantity in Drachms.	Water in Pints.	Effect on Grass, perfection being taken at 10.
Nitrate of soda	6	3	10
Nitric acid	4	..	8
Ammonia*	$1\frac{2}{3}$	..	5
Soda*	$1\frac{2}{3}$	..	0
October 4.			
Nitrate of soda	6	$1\frac{1}{2}$	10
Ditto	3	..	5
Nitric acid	2	..	7
Ammonia	$1\frac{2}{3}$	..	5
Potash*	3	..	0

The success therefore of the experiment was complete. The question being whether in saltpetre the alkalies or the acid contain the active principle, we have found upon a given soil the alkalies absolutely inoperative, while the acid has acted exactly like saltpetre itself, and like ammonia. The action, indeed, does not follow any precise proportion to the quantity of nitric acid employed, but neither does it to the quantity of saltpetre. For both, as is the case with other manures, there is no doubt a maximum, to exceed which is useless, and may even be prejudicial. But the action of the nitric acid was palpable, unfailing, and indeed very powerful. On many other parts of the grass-plot sprinklings of the diluted acid were poured, and were everywhere followed by a dark luxuriant vegetation. We may now therefore assume, with unhesitating certainty, as a great law of nature, that *substances strengthen vegetation mainly by their contents of nitrogen.*

This law sheds at once an harmonious light over the scattered facts which the unlettered husbandman has learned while still groping in the darkness of practice. If we look at the practice of manuring only, we find the most dissimilar substances applied to the soil—sprats or sticklebacks here ; woollen rags, or shoddy, or hornshavings there ; sea-weed in another place, rapecake elsewhere. All these refuse matters, however, agree in containing

* The carbonates of ammonia, soda, and potash.

undeveloped nitrogen. Again, lupines, sown for the purpose, are in some countries ploughed in as manure, as are the remains of the clover-crop, both also containing nitrogen undeveloped. In dung and in liquid manure the nitrogenous matter is *partly* combined with hydrogen, and has thus become ammonia. In other manures, as soot and gas-water, the pungent smell shows the *full* development of ammonia. Again nitrogen may combine not only with hydrogen to form an alkali, ammonia, but with oxygen also to form an acid. That acid, in whatever combination, whether with potash, soda, or lime, is equally active ; nay, as I have now shown, the consuming liquid itself is able to nourish the tender herbage of the green lawn. This same law explains moreover not fertilizing substances alone, but the fertility of the soil itself also throughout many wide tracts. Not only are the plains of Hindostan made fruitful by their native saltpetre, but the famous Tchornoi Zem, or black earth, which over wide tracts around Tamboff bears wheat crops in endless succession, and will not endure to be dressed with dung, has been found by late analysis* to be charged with nitrogenous matter, the remains of living organisms. Nay, when poets† tell us that battle-fields are rendered fertile for ages by patriot blood, we now understand scientifically this mournful memorial of human slaughter.

The admission of this truth has been delayed, according to Dr. Wilson, by "a reluctance in teachers of chemistry to admit two sources of nitrogen for plants, because it complicates their statements and multiplies their formulæ." The awkwardness is no doubt the greater, because the substances in question are not merely duplicate, but of opposite natures ; the one, ammonia, being alkaline, and the other acid. Dr. Wilson suggests, not unjocosely, that the exclusive advocates of ammonia should assume the conversion of the nitric acid into ammonia before any organic compound is developed, and thereafter carry out the ammonia theory as before.‡ On

* See M. Payen's analysis in Sir R. Murchison's account of the Tchornoi Zem, Journal III. 132.

† "Nec fuit indignum superis bis sanguine nostro
Emathiam et latos Hæmi pinguescere campos."

"Emathia, Heaven decreed, was twice imbrued,
And Hæmus' fields twice fatten'd with our blood."

Georgics: WARTON.

Lucan also, in speaking of the same battle-field of Pharsalia, mentions the darker hue imparted to the young corn by past bloodshed, as well as the remains of fallen warriors turned up by the plough :—

"Quæ seges infectâ non surget decolor herbâ ?
Quo non Romanos violabis vomere Manes ?"—*Pharsalia*, VII.

‡ Dr. Hartstein, Director of the Prussian Agricultural College at Poppeldorf, in an able work he has just published on the 'Improvement of English and Scotch Farming,' argues earnestly for this previous conversion of nitric acid into ammonia. "This occurs," he says, "as follows :—The hydrogen liberated by the decomposition of organic substances, when it meets the nitric acid of saltpetre, not only withdraws from it oxygen, and so forms water, but, further, hydrogen in the *nascent* state combines with the nitrogen, forming ammonia, the food of plants. In thus explaining the beneficial action of saltpetre, we find

the other hand, the distinguished chemist of Cirencester College, Dr. Voelcker, informs me that, in his opinion, "plants in general are *more* dependent upon nitric acid, as the source from which they derive their nitrogen, than upon ammonia." Within soils containing lime—and most soils contain lime, either natural or applied—Dr. Voelcker thinks that nitrogenous manures are converted not into ammonia, but into nitric acid. Now, of the manures above enumerated, two only are strictly ammoniacal, namely, soot and gas liquor. Of the others, in some, such as fish, rags, &c., the nitrogen is as yet undeveloped, and may therefore assume in the soil the form either of ammonia or nitric acid, we know not which. In fresh dung and urine it is *mainly* undeveloped. Even in guano, Dr. Voelcker has found it developed only to the extent of one quarter. But in all these cases he conceives the undeveloped nitrogen to be changed within suitable soils into nitric acid. Further investigation is evidently required. The general law is established as to nitrogenous matters: but whether they act upon plants in two forms, ammonia and nitric acid, or whether by some secret of nature either of these forms is transmuted into the other before it serves the purpose of vegetable nutrition, is a question reserved for the future decision of agricultural chemists.*

Singularly indeed, while we are discussing the question, it has been discovered at Paris that nature supplies to plants both forms of nourishment indifferently in every shower. Our English chemist Cavendish showed in 1781, that the electric flash *might* produce nitric acid in the atmosphere. Liebig has since ascertained the actual existence therein of ammonia. Monsieur Barral, having examined the rain-water collected at Paris last year and the year before, has found in every shower an amount of each substance, reaching in the course of a year the following quantities severally per English acre :†—

		Nitrogen.
	lbs.	lbs.
Ammonia	12·29 =	10·69
Nitric acid	41·24 =	10·12

Still this large amount of manuring substance might be derived by the atmosphere of Paris from the smoke and the fœtid exhalations which float

no scientific contradiction. The transformation of nitric acid into ammonia by hydrogen, when this latter substance is liberated from combination, and comes simultaneously into contact with nitric acid, is a well-known fact."—*Fortschritte der Englischen und Schottischen Landwerthschaft*, von Dr. Edward Hartstein. Bonn. 1853.

* For a very instructive inquiry into the difficult subject of nitrification, see 'Experiences Chemiques et Agronomiques, par F. Kühlman. Paris, 1847.' This work also contains a series of experiments proving the nitrogenous hypothesis of manures; and also a direct experiment establishing the action of nitrate of lime, which had not previously come to my knowledge.

† The figures of M. Barral are so corrected by Dr. Wilson.

above every great capital, and much doubt was accordingly felt by continental chemists on the whole result of the investigation. It seemed desirable, therefore, to repeat the experiment in pure country air. Accordingly rain-water was collected by me last October at this place, which is remote from any large town, except Oxford, from which the wind did not blow while the showers took place. It was analysed by Professor Way; and, supposing our annual fall of rain to be 28 inches, the amount of manure yearly poured down from the clouds on our soil would be larger than even at Paris. For it would stand thus :—

		Nitrogen.		Nitrate of Soda.		Guano without Phosphates.
	lbs.	lbs		lbs.		lbs.
Ammonia	28·59	= 23·54	=	$159\frac{3}{10}$	=	164
Nitric acid	68·91	= 17·88	=	121	=	$124\frac{6}{10}$
Annual downfall of manure per acre		41·42	=	$280\frac{3}{10}$	=	$288\frac{6}{10}$

It appears that in a year of ordinary rain the skies give us ammonia and nitric acid equal to a full dressing of saltpetre or guano. Much of each, especially the ammonia, is lost, perhaps, by exhalation from the surface of plants or of the land after slight showers. Enough, however of both must remain to account for the luxuriant growth which sometimes seems to follow a thunderstorm, and also to illustrate the Psalmist's expression that the clouds drop fatness. This atmospheric distillation may also account for the permanent fertility of downs from which the sheep have for centuries been removed every night—in some degree for the benefit conferred by rest upon fallows—partially even for the remarkable repetition of wheat-crops at Lois Weedon, if we suppose that the constant stirrings practised by Mr. Smith enable the soil to absorb the pluvial nitrogen that might otherwise escape by evaporation. In any case, this large discharge of nitric acid as well as ammonia is rendered important by the direct evidence now attained for the action of that acid upon vegetation.

Nor will our better acquaintance with nitric acid be limited, I trust, to the theory of agriculture, or remain a dead letter, without effect on our practice, for we now know with certainty the efficacy of the nitrates. But one great chemical problem of agriculture is the prevention of waste in dung-making; yet the attempts to fix the ammonia of dung have not been very happy. While some methods have not fixed it at all, others have cost in fixing it more than the result, if attained, would be worth. The favourite proposal has been the formation of sulphate of ammonia, which, under

ordinary circumstances, is a fixed salt. But an experiment made last spring on this farm will show how little we can depend on the fixity so dearly obtained.

A ten-acre piece of oats, looking last spring very badly, was dressed on one side with nitrate of soda, and with sulphate of ammonia upon the other side, a blank space being left in the middle. Since the nitrogen in the ammonia and in the nitrate were in the proportion of 20 and 15 respectively, I made no doubt that, as equal quantities, 6 stone of each per acre, were used, the ammonia would yield the bulkier crop. On the contrary, while the nitrate, though a moderate dose, gave an increase of 18 bushels per acre, forcing the straw, too, a foot higher, no difference at all could be seen between the yield of the unmanured and of the ammoniated land. This unaccountable result has been cleared up, however, by Dr. Voelcker, who informs me that sulphate of ammonia had equally failed on the Cirencester farm ; that he had often remarked a pungent odour on the land where it was used, and has little doubt that this salt, however carefully fixed, had been decomposed again, and dissipated by the natural lime of the soil.*

On the other hand, great fault has been found with our ordinary mode of making dung by laying it up in heaps. It has been said that when first put together, these heaps show the presence of ammonia by the pungent smell that escapes from them, but that after a few months their scentless state proves them to have become little better than dead woody fibre. Still it was clear that this apparently inert matter, though it gave forth no odours, had a powerful effect upon the farmer's crops, and I have long suspected that dunghills might contain nitre. Mr. Nesbitt informs me that by chemical analysis he has repeatedly found nitrates in ripened dung. The alkali required might be furnished by the potash of the decayed straw. But he has also found, what is a very curious chemical fact, that whereas, for forming a salt, some alkali or other is required to combine with the acid, and whereas further, nitrogen, when liberated from decomposing matter, may become either nitric acid or ammonia, which is an alkali, *both* nitric acid and ammonia are in fact sometimes formed in fermenting manure at the same time, for the very purpose, as it were, of combination ; for Mr. Nesbitt finds nitrate of ammonia† in dung-heaps. This is certainly a remarkable effort of nature to prevent waste of fertilizing materials, but a lesson which in our domestic arrangements we can hardly be said to obey.

Again, no farming practice has been more decidedly blamed than the west country method of mixing lime with the dunghill, because lime decomposes salts of ammonia. It was forgotten, however, that in fresh dung the ammonia

* On other soils sulphate of ammonia has been found operative, but it is evidently not a manure which can be adopted anywhere without previous trial, to be used upon the *surface* of land.

† See Mr. Nesbitt's letter appended to this paper.

is *not yet formed*, while the undeveloped nitrogenous matter contained in the dung may be most effectually fixed by the lime—may become nitrified through the mixture, exactly as in the French nitre-beds, by which saltpetre was produced during the late war for the manufacture of gunpowder.* So cautious must we be in drawing chemical inferences for farmers without careful and direct experiment.

In compost heaps, too, nitrates are doubtless produced, and the suggestion of Mr. Nesbitt is well worth consideration, that in making our dung we should no longer aim at fixing ammonia, which eludes our grasp, but at forming nitrates, in accordance with the practice of husbandry and the explanations of science. Dr. Voelcker's opinions point the same way, and, in justice to him, his views ought to be presented as communicated to me for my own information.

"I am glad that you are advocating the use of nitrate of soda in agriculture, for I have long entertained the opinion that the functions of the nitrates, in relation to the nutrition of plants are of the highest importance, and that the more liberal application of nitrate of soda will be a great boon to the farmer.

"It appears to me that plants in general are *more dependent on nitric acid, as the source from which they derive their nitrogen, than upon ammonia*. Already, four years ago, I came to the conclusion that ready formed ammonia ought not to be applied to calcarious soils, and have recommended accordingly to bring the farmyard-manure on such land as fresh as possible; and in artificials, to supply the place of the ammonia by *nitrates*.

"I have been led to this conclusion by the following theoretical reasonings, which I had occasion likewise to observe confirmed by local practice.

"Lime readily displaces ammonia from its salts, and being volatile, we can understand that much of the most essential fertilizing constituents of well fermented dung, will be lost when it is applied to a calcareous soil.

"If, on the contrary, organic nitrogenized matters are decomposed in contact with strong bases, such as lime or potash, the nitrogen they contain is converted into nitric acid, and not, as usual, into ammonia. *Fresh* dung, in which the greater part of the nitrogen which it contains is not yet changed into ammonia, as appears to me, should be employed on calcareous soils; because it is highly probable that the lime in such soils will convert the nitrogen of the nitrogenized substances of the manure into nitric acid—a compound which in combination with bases, appears in many circumstances to exercise even a more powerful invigorating effect than ammonia itself. In confirmation of these views I have frequently observed that guano shows a much more marked effect on other soils than very calcareous ones. On our own farm I have frequently observed a very powerful smell of ammonia,

* According to the prevalent opinion, caustic lime would decompose the urea contained in fresh manure, but Dr. Voelcker informs me that experiment leads him to an opposite conclusion.

especially in dry weather, in walking over fields which had been top-dressed with guano.

"Some years ago we used sulphate of ammonia on several thin stony calcareous soils, and portions of the fields were left undressed, in order to observe any difference in the crop; but not any difference could be seen in the portions of the fields which were not manured with sulphate of ammonia. The smell of ammonia on the land on which sulphate of ammonia was employed, was very strong indeed, and I have little doubt that almost all the ammonia contained in the salt has been driven off by the lime in the soil, and that for this reason no effect in the appearance of the crop has been observed.

"That guano still exercises a very powerful action on calcareous soils need not astonish us, for although a portion of nitrogen contained in it in the form of ammonia, is driven off when guano is employed on such land: by far the greater quantity of nitrogen in guano exists in it as uric acid and other organic compounds, which, in contact with lime, will give rise to the formation of nitrates on their decomposition. Besides, guano contains phosphates and salts of potash."

Our acquaintance then with the main law of manures stands at present as follows:—The nitrogen of most manures is committed to the soil in a neutral state, capable therefore of uniting either with oxygen to become nitric acid or with hydrogen to become an alkali, ammonia. Some few manures contain ammonia ready formed, some other few nitric acid. It seems clear that the neutral nitrogenous matter is converted into ammonia or into nitric acid before it is absorbed by the plant. So that we have only two alternatives to consider, and not three. But it is uncertain as yet whether plants can feed indifferently on each of the two substances, or whether one of these is first transformed into the other; whether, that is, the acid is changed into the alkali, as Dr. Wilson deems possible and Dr. Hartstein asserts, or whether what appears a more easy transformation takes place, and ammonia is changed into nitric acid.

This scientific question between ammonia and nitric acid assumes indeed further a very practical commercial shape. For, as is well known, our main foreign supply of manure reaches us from the rainless side of South America, in rival cargoes of guano and cubic saltpetre, the former of which, as it happens, is ammoniacal, the other a nitrate. Now this rivality is most important, since the guano trade is a monopoly of the Peruvian Government; and, even were the trade open, there is a doubt how long it would last, for in that free republic, as we are told, Don Domingo Elias was sent to the gaol of Callao last summer for alleging that the supply of guano would be worn out in nine years.

This sensitiveness of the Peruvian rulers in itself raised suspicion; and authentic intelligence has just reached our own Government from the admiral in command on the coast of Peru, which renders the whole question

of monopoly less important, inasmuch as, if Admiral Moresby's report be accurate, the entire trade may come to an early end from exhaustion of the material.

According to a semi-official statement of the Peruvian Government,* the total deposits of guano in their territory amounted nearly to 27,000,000 tons, which, at a yearly export of 200,000 tons, would last more than a century. It was apportioned as follows :—

Northern District, ...		854,000
Middle ditto, *(Chinchas Islands,)* ..		18,250,000
Southern ditto, ...		7,621,000
Total, ...		26,725,000

But Admiral Moresby states that the larger of these Spanish numbers is reduced by English survey (no unusual occurrence, by the way, in the Peninsular war) from 18,250,000 to 8,600,000 tons. Furthermore, it appears that, of this reduced quantity, only one-half is by its quality fitted for English consumption. This reduced amount is also now being exhausted more rapidly by an active demand from the United States; for the American ships loading at the Chinchas actually exceed the British in tonnage. In short, Admiral Moresby, in his official despatch, comes to the conclusion that, "at the present average rate of exportation, the islands would be exhausted of the guano that would pay freight, or be saleable in the English market, in *eight or nine years*." It is true that the Admiral's survey has been limited to the middle district, the Chinchas Islands, and that, according, to the Peruvian Government, the Northern and Southern districts contain 8,000,000 tons of guano besides. But when we have made due allowance for the airy amplitude of Spanish arithmetic, and also a deduction for inferior *quality* from the gross *quantities* which English officers may find in existence, it is to be feared that those other districts may not add many years to our lease of this valuable manure. The prospect is formidable, since 150,000 tons of guano are now imported yearly, and nearly a million and a half sterling expended by spirited English and Scotch farmers, whose management is entirely dependent upon this foreign manure. We must now, therefore, look the difficulty in the face and prepare for the emergency. A fresh source of supply is of course desired, and our vessels are on the look-out for one; but the samples of new guano lately brought home have been found deficient in the essential ingredient nitrogen. One guano, indeed, met with, how extensively seems doubtful, in island caves of the Indian Archipelago and on the coast of Tenasserim, and produced not by seafowl but bats, does contain nitrogen, not indeed as ammonia, but as *saltpetre*. This *transmuted* guano, used successfully in the spice plantations of Penang contains a warning, as it were, that, instead of merely searching the seas, with

* Correspondence on the Guano Islands, presented to the House of Commons, May, 1852.

whatever hope, for more guano, we should at once recognise the most valuable ingredient of guano, as it is found for the digging on the vast salt-plains of Tamarugal, at the foot of the Andes. The supply, too, of nitrate is likely to increase, not diminish, for, since attention was drawn in this Journal last winter to its manuring efficacy, an engineer has proceeded from England to construct a railway from the port of Iquique. It may be useful then to conclude this short notice by a comparison between guano and cubic saltpetre, as applicable and applied to particular crops ; and if any one imagines that guano belongs only to amateur farming, Mr. Stevenson will tell him, that in East Lothian* the money expended on portable manures may be taken at 12*s.* to 18*s.* per acre on the whole cultivated land of the county, that from 400*l.* to 600*l.* is a *common* yearly expenditure for guano on individual farms, and that, "the largest acreable produce known to him is from land naturally very inferior, a cold retentive clay resting upon the coal formation,"—the worst of all subsoils—20*s.* per acre rent being paid to the landlord, but to the guano-merchant 46*s.* per acre, or *a thousand pounds yearly.*

In comparing the two manures we must not, of course, forget that, besides nitrogen, guano contains phosphorus and potash. These ingredients, however, can be easily added to each ton of saltpetre, if wanted, at a cost of 1*l.* 13*s.* 9*d.* for phosphorus, and 14*s.* 8*d.* for potash ; but the potash, I believe, would be rarely, and the phosphate not often, required.

Large as is the importation of guano, the crops to which it is applied are few, and the comparison of it with nitrate of soda as applied to those crops need not be tedious, for guano is used chiefly as follows :—First, as a top-dressing for grass ; next, drilled with wheat in autumn, or sprinkled over wheat as a top-dressing in spring ; lastly, for turnips.

The practice of top-dressing grass can hardly, indeed, be called a *practice* as yet. The careful experiment directed by H. R. H. Prince Albert to be made on the Windsor Farm, and recorded in this Journal,† while it proved that the use of *both* the leading nitrogenous manures is profitable upon grass, gave the advantage to guano. This advantage might have been accidentally due to the heavy rains which, prevailing at the time, may have washed down the nitrate below the roots of the grass. But information which has just reached me from an eminent Scotch farmer, Mr. Hope, of Fenton Barns, confirms the Windsor experiment. Mr. Hope's opinion derives great weight from the extent of his experience, for he occupies 660 acres, and states moreover that, *unless portable manures are applied at the rate of* 1*l. per acre over the whole farm, he cannot continue to farm at a profit.*‡ He writes to me thus :—

* See Report on East Lothian in the present number, p. 304.

† Journal of Royal Agricultural Society, XIII. p. 347.

‡ See Mr. Stevenson's account of Mr. Hope's farm in the present number, p. 317.

"For many years I have been in the habit of applying nitrate as top-dressing for clover and rye-grass, to be cut as green food and for hay. I generally sow it broad-cast on the grass early in April. I have found that 180 lbs. per imp. acre was a fair allowance, but that it paid better, from a heavier crop being obtained at less expense, to give only 90 lbs. nitrate and 180 lbs. of Peruvian guano, *this being also better than double the quantity of guano by itself.*"

This result of Mr. Hope's experience is intricate, but appears to show on the one hand that, on his particular soil, the nitrogen of the saltpetre requires to be aided by the phosphates, perhaps even by the potash contained in guano, and to prove on the other hand that a *small* dose of those salts is sufficient, while the superior *fixity* of the nitrogen contained in the nitrate compensated its greater *quantity* in the guano. For we know that in dry weather a total loss by surface exhalation has sometimes attended the use of guano; and as upon grass-land guano of course cannot be harrowed in, it would appear thriftier to use nitrate only, with the addition of superphosphate, and, if requisite, potash, for grass; we have striking evidence from Scotland for the profitable application of nitrate even *singly* to grass-land. Thus Mr. Main, of Mid-Lothian, in his Prize Essay,* tells us :—

"Top-dressing on grass, whether for hay, soiling, or pasture, is of immense advantage. A remarkable instance occurred in my own experience three years since. A field of 15 acres had been laid to permanent pasture some six years before. It is not naturally a grass soil, indeed the very reverse. For three years, however, it yielded well, and kept a large amount of stock. In the fourth it began to fail, the fifth was still worse, and in the sixth it may be said that 12 cows *starved* on it. In the seventh it was top-dressed with a ton of nitrate in April, and the results were astonishing. The stock pastured on it that year was 13 milk cows (2 with calves suckling), 5 stirks, 3 colts, and at intervals 60 sheep. I have continued to benefit by this experience. A large amount of roughness (rough grass) was left for wintering ewes, which I could not in the two previous winters fold in the same field."

On the average then of seasons, nitrate, aided by superphosphate if need be, appears preferable to guano for top-dressing grass, and in this application of it no risk can arise from over-luxuriant growth.

Not so in its use upon wheat, for which purpose a combination with salt can alone render it safe. But there are two modes of supplying wheat with pulverized manures—autumnal drilling and spring top-dressing. An experiment tried here this year throws some light upon both methods, and may be the more useful as involving the total failure of one.

The trial ground had been purposely exhausted by white crops for three previous years. Four different manures were drilled with the wheat in the

* Transactions of the Highland Society, July, 1853, p. 16.

autumn ; one-half of each lot was dressed with nitrate and salt, at two dressings, in spring. The produce was threshed out on the field, separately, after harvest. Contrary to the experience of others, and to my own upon the same land, none of the drilled manures took any effect. The soil is a sandy loam, and they must all have been washed down by the unusual rains. But the spring dressing with nitrate took a singularly powerful effect, as the following table will show :—

Turns of the Drill.	Manure. Cwts.	Yield on Undressed 2½ acres. Bushels.	Yield on Top-dressed 2½ acres Bushels.	Increase by 2 cwts. Nitrate. Bushels.
10 Guano	3	6¼	13	..
10 Blood	3	6¾	12½	..
10 Rapedust ..	6	4½	11¾	..
10 Nitrate	3	5⅕	11¼	..
2 Nothing	0	1	2¾	..
Five acres.		23⅗	51¼	27⅝

It will be seen that the *natural* produce of this land is very low—only 9 bushels of wheat per acre, and that owing to the season the drilled manures were all but thrown away. The profit by the top-dressing of nitrate was, on the contrary, exceedingly high. On about 2½ acres of wheat, 2 cwt. of nitrate and 4 cwt. of salt, costing less than 2*l.*, gave about 3½ quarters of grain, which at 57*s.* sold for nearly 10*l.*—in exact figures 9*l.* 17*s.* Last year I ventured to say that if nitrate could be reduced in price by *one-half*, a large additional home supply of wheat might be grown at 12*s.* per quarter. This year, at the *same* price of nitrate, these extra 3½ quarters stood me in less than that sum. It is curious that poor land, producing merely 9 bushels per acre, was enabled by 90 lbs. of nitrate, costing with the salt 15*s.*, to grow 20 bushels per acre. So great an increase is however exceptional, nor would it be safe to take the average increase of wheat by the use of nitrate at more than 6 bushels per acre, but the poorer the land the greater will be found its efficacy.

Being satisfied as to the superiority of nitrate to guano *as a top-dressing*, I have made no further comparative trial, but have been fortunate enough to receive from the high authority of Mr. Hope the following decisive experiment carried out by him in the two last seasons :—

"I have only applied nitrate for two years to wheat, and that after seeing the account of your own experiment in Mr. Caird's English Agriculture. In April, 1852, I top-dressed wheat after potatoes ; the soil a dry gravelly loam. At the time the wheat was not very promising in appearance. I sowed on part 1 cwt. nitrate mixed with 1 cwt. salt per imp. acre ; on another

portion 3 cwt. Peruvian guano was applied, and a part got nothing. The nitrate of soda soon took the lead, and kept it. A portion of each was threshed separately, when they were found to yield as follows; viz.—

Per Imp. Acre.

Cwt.		Straw.	Wheat.
1	Nitrate of soda	37¾ cwts.	53 bushels.
3	Guano	36 „	49 „
	Nothing	33 „	39 „

"In 1853 I tried the same thing on wheat after beans; I never, however, could detect any difference with the eye except where the crop got nothing, though in the former year the difference between the two manures could be seen at a glance; and having cut the crop with a reaping-machine, which rather intermixed the lots, I was prevented threshing them separately. I have bought 5 tons nitrate for next year, and mean to apply a portion to potatoes."

Here it appears that *three* cwt. of guano, costing about 30s., were surpassed in 1852, and equalled in 1853, by *one* cwt. of saltpetre, costing with the salt but 18*s*. Indeed, guano is so liable to escape in dry weather upon a hot surface, that it cannot compete with nitrate as a top-dressing. For autumn sowing it is probably better than nitrate; but then the question arises, ought we on *light* soils* to use at that season either one or the other? When we consider how soon the growth of autumn-sown wheat comes to a stand-still to provide it with manure, in the hope that the food may remain safe for its use in the spring, seems at best a venturous precaution, like placing beneath an infant's pillow the cakes intended for its morning repast.

There remains only to be considered the applicatiou of guano to turnips, but here the comparison of the two manures is less easy, because a previous question arises, whether either one or the other should be applied to turnips at all, or whether in the culture of those roots we should not rather

* On strong soils the case is different, as the following experiment made by Mr. Caird at Baldoon, in the same wet autumn of 1852, clearly shows. The result was as follows:—

Experiment with Guano on Wheat sown after Fallow on drained alluvial Clay, the Guano (Peruvian) harrowed in with the seed, 20th September, 1852.

	Cost per Acre.	Yield in Bushels.	Increase.	Grain after deducting cost of Manure. Wheat at 7*s*.
	s.			*s*.
1. One acre without manure	..	35	..	...
2. „ 2 cwt. guano ...	20	44	9	43

rely upon bone-earth. From experience I have long done so on my own farm; there are on record experiments clearly showing that on some land superphosphate is not only cheaper than guano but more effectual, and as the consumption of guano for this purpose is very great, especially among the spirited farmers of East Lothian, it will be worth while to recall one or two of those experiments, and first a very striking one made by Mr. Drewett, near Arundel:*—

Purchased manure.	Weight of Turnips, per acre. Tons	Cwts.
None	5	18
3½ cwt. Peruvian guano	9	2
3½ cwt. African guano	13	1
Superphosphate from 6 bushels *calcined* bones ..	17	10

It is observable here that not only has the superphosphate excelled the guano, but the cheap African has surpassed the dear Peruvian guano, because it contains less nitrogen indeed, but more of the phosphates. Mr. Caird also states that the inferior and cheaper Bolivian guano is better for turnips than the Peruvian, the ground of that superiority of course being the same, the excess of phosphates in a given weight of Bolivian guano.

Mr. Lawes even found that where he had supplied his turnips with superphosphate all the nitrogenous manures he could add to that manure produced no increase in his crop.

Nitrogenous Manures added.	Mean produce of Turnips per acre. Tons.	Cwts.
Phosphates, &c.	12	8
„ with 10 cwts. of rape-cake ..	13	4
„ with 3 cwts. sulph. ammonia ..	12	5
„ with 10 cwts. rape-cake, and 3 cwts. ammonia	12	4

Still, though both experience and experiment in the South of England are in favour of giving phosphorus only to turnips, and of reserving nitrogen for the corn crop, it would be rash to assert that our northern farmers are wrong when they use guano, and deference is due to their experience also. We find indeed, that ammonia sometimes thins the plants, and that it produces the growth of leaf rather than bulb. Possibly from our necessarily late season of sowing, that excess of leaf has not *time* to mature the weight

* Journal, Vol. 1. p. 582. Each lot received also 20 bushels of dung, and 200 to 250 bushels of turf-ashes.

of bulb, while the cooler skies of the north allow it to ripen by permitting an earlier sowing. Be that as it may, I thought it right to try nitrate upon turnips this year, in order to ascertain whether, in case of need, it might become a substitute for guano with this crop also. Guano itself, however, was not used in the comparison because that being a compound substance, the experiment would have been more complicated. All that I wanted to know was whether the nitric acid of the salt would act upon root-crops like the ammonia of the birds'-dung, since if this were so, the other constituents of guano might be easily added. The nitrate and the ammonia* were applied in equal quantities, and they acted exactly alike; so much so, indeed, that, though very small doses of each were applied through the water-drill, they both seemed equally to have killed all the seed. However some stragglers came up, sufficient to fill the rows, which grew very slowly at first, but became luxuriant afterwards, and certainly would have gained bulk for another month if they had not been stopped by a November frost. No difference could be seen in the action of the two manures, and the test of weighing showed their effect to have been nearly identical.

Swedes per Acre.

	Tons.	cwts.
No manure	16	8
Nitrate, 160 lbs.	20	8
Ammonia sulph., ditto.	20	1

The result of the whole comparison appears to be this. For grass-land, saltpetre is equal to guano if a small quantity of phosphates and perhaps of potash be added. For wheat it is probably inferior to guano if applied in autumn, because more liable to be washed down by rain, but preferable if used in spring, because less liable to evaporation in drought, and spring is apparently the best season for giving purchased manures to wheat. For turnips superphosphate is superior generally to either guano or nitrate, and has the great advantage over both, that it can be used with the water-drill, and that, being so used, it gives us in the south a rapid growth which makes up for our late seed-time; but if nitrogenous matter be also required, we now know that nitrate can be spread broad-cast over turnip-land as successfully as guano itself. We have therefore found a substitute for guano in the three great departments of husbandry, the culture of grass, of roots, and of corn.

The comparison of nitrate with guano is even more important this year than it was a twelvemonth ago. Then our object was to lower the price of guano by bringing into competition with it another article not sold under

* The sulphate of ammonia was used, and was well mixed with the soil, so that there was no risk of its escape by evaporation.

monopoly. Now, the recent survey of the Chincha islands shows thut we have to fear a rise in the price of guano preceding a total cessation of the supply. The possession, therefore, of an equivalent is more desirable, and now that we have found that equivalent, the increased supply of cubic saltpetre is more urgent, and to that point the enterprise of our merchants must next be directed. This salt we know occupies the surface of a plain 150 miles long, the Pampa of Tamarugal, separated by only 10 miles from the Pacific. Unfortunately, however, those ten miles wear so rugged a surface, that although a railway is being constructed from the port of Iquique, to a height of 3000 feet inland, it cannot be continued to the refinery; so that the coals for refining the salt, and the salt when refined, must still be carried on the backs of mules to and from these southern Salitres. But to the north of Iquique is the mouth of the river Pisagua, which skirts the Pampa not very far from the northern Salitres, affording of course a level line for a railway in the direction required. On the south, again, the river Loa offers the same facilities, passing near some newly-discovered nitrate beds. All these sources, however, have unfortunately one common defect—they are subject to the same government which owns the guano islands, the government of Peru. But Mr. Bollaert, our main authority, informs us that nitrate is also found higher up the river Loa in the desert of Atacama, which belongs, I believe, to the rival government of Bolivia. It is further stated, though in a less authentic manner, that saltpetre plains exist to the west of St. Luis de Potosi, in Southern Mexico, with water communication to the Atlantic. In all those remote regions inquiry has been set on foot through the resident consuls by Lord Clarendon, and their answers will be communicated to our Society; but in the meanwhile the Liverpool merchants, who have been naturally eager to share in the guano trade, should not neglect to make exertions of their own in these more promising fields. Whether they fetch us guano or nitrate, we are now assured that they supply our land with the same manure, differing indeed in name and in form, but identical in substance and virtue. Such is the solid result established by chemistry, and thus I hope to have made good what I ventured to assert in the outset, that abstract investigation may sometimes serve to guide us safely amid practical difficulties.

PUSEY, *Dec.*, 1853.

N. B.—The amount of Nitric Acid and Ammonia contained in rain must be regarded as open to future observation and correction.

APPENDIX.

To Mr. Pusey.

DEAR SIR,—At your request I subjoin a few observations on the conditions required for the formation of nitrates; much regretting that, in consequence of the approaching publication of the Journal, I have not time to present the subject before you in a more perfect manner.

For some years, in my lectures, I have endeavoured to direct the attention of the farmer to the artificial formation of nitre, having felt somewhat surprised that its importance has hitherto been so generally overlooked.

I shall at present content myself with a brief explanation of the condition, under which NITRATES are formed. Whenever animal or vegetable matter gaseous, liquid, or solid, containing nitrogen, comes into contact with *mild* calcareous or alkaline earths, the mixture being moist, and so porous that the air can easily penetrate, after some time the nitrogen, under certain conditions of temperature, is acted upon by the atmosphere, is oxidized, and is converted into nitric acid, which at once unites with the calcareous or alkaline bases present in the mixture.

The temperature most suitable is from 58° to 68° Fahr., and the action ceases at 32° Fahr., the freezing point.

The instances of the oxidation of gaseous nitrogenous bodies are very common. The mortar of almost all old buildings, in any situation, contains a greater or less amount of *nitrate of lime*, the nitric acid of which is produced by the oxidation of ammonia, absorbed by the mortar from the atmosphere. Another example is that furnished by an experiment of a French philosopher, who suspended a piece of moistened and well-washed chalk over a basin of putrifying blood, and who, after the lapse of some time, detected easily the presence of nitric acid in the chalk.

The oxidation of liquid nitrogenous compounds is also of ordinary occurrence. The urine of any animal mixed with calcareous or earthy matter readily furnishes nitrates by oxidation; and even the urinary deposits of animals on pastures in summer give rise to the formation of nitrates. The walls of stables and cowhouses, which by absorption have been moistened with urine, often give on their surfaces efflorescences of nitre.

The conversion into nitric acid of the nitrogen of solid animal or vegetable matters constantly occurs when these bodies are in contact with earthy calcareous matters. Even in the absence of calcareous substances nitric acid is formed in such common dung-heaps as consist merely of decomposing animal and vegetable matter; for one part of the ammonia produced by ordinary decomposition acts as the alkaline base to another portion, which by oxidation is converted into nitric acid. Nitrate of ammonia may always be found

in dung-heaps. Nitrates are also present in all shallow wells adjacent to *church-yards*, and in those which derive their liquid supplies from strata into which cesspools empty themselves.

The proper conditions for the formation of *nitrates* are always to be found in well-drained and well-manured fields, particularly when they contain calcareous matter. One of the great uses of liming is to furnish the alkaline matter where it is deficient. In our laboratories we have examined a great number of soils, and in almost every instance have detected the presence of nitre.

In my opinion, a proper knowledge of the mode of forming nitre beds would be of considerable importance to the farmer; for by their use not only would he be able to conserve the ammonia of his manure when he had more of the latter than he could at once apply to the land, but by using the liquid manure from the tanks the necessary moisture would be given to the heap; and whilst the aqueous particles, so expensive to carry, would gradually evaporate, the valuable matters of the liquid would be retained in the compost.

The mode of making artificial nitre-beds has been shortly described in my lecture to which you refer. It is exceedingly simple. A layer of calcareous matter forms the base of the heap, and layers of horse-dung, cow-dung, carrion, or other similar matters alternating with layers of marl, mortar, or *spent* lime, will constitute the nitre-bed. The mixture should always be kept moist with urine, or urine and water; but too much water, as from rain, would be injurious, and the heap ought therefore to be kept under cover. The compost should lie as loosely as possible together, that the air may be easily able to permeate the mass. The heap should be thoroughly incorporated, and lightly turned over once in two or three months. In from six to nine months it will be ready for the farmer's use. *Quick lime* ought not to be used in making nitre beds, as its first and most powerful action is to drive off the ammonia from the manure.

It must be understood that, by making mixtures calculated to give rise to the artificial production of nitrates, we have a means of preventing the loss of ammonia which takes place in a common dung-heap; and that, under ordinary circumstances, manures containing either nitrates or ammonia, without any important amount of other substances, are valuable exactly in proportion to the amount of nitrogen they contain. It may be necessary to mention that in soils and dung-heaps the nitric acid produced by oxidation of ammonia *is reconverted* into ammonia when putrefaction is taking place and *access of air is prevented*.

In conclusion, I may mention that I have analysed a portion of a large nitre-bed of about 40 tons, which was (about ten months since) made on the premises attached to the College at Kennington. Though the heap has been exposed to all the rains of the season, it was found that one pound weight

of the compost contained 21 grains of nitric acid, which is equivalent to 34 grains of saltpetre. This is an amount much below what we should have found had we had the heap under cover.

I am, &c.,

College of Agriculture and Chemistry,
Kennington, Dec. 13, 1853.

J. C. Nesbit.

On the Rheea Fibres of Assam and the Hemp of the Himalayas.

Rheea fibre, value of.

The Rheea fibre forwarded by the Government of India, as the produce of Assam, in order that its properties and value may be correctly ascertained in this country, appears to me likely to prove one of the most valuable products of India, for in strength it exceeds the best Hemp, and in fineness it rivals the superior kinds of Flax. Its culture is well known to the natives of Assam, and in the districts of Rungpore and of Dinagepore, being their *Kunkhoora*. It is known in Burmah, and is the *Pan* of the Shans, the *Ramee* of the Malays and of Java, and the *Caloee* of Sumatra. Its culture succeeded in Tenasserim, and is practised in Siam, as in other Eastern countries and islands. It can now be produced and sold with profit at as cheap a rate as Russian Hemp, and if any machine could be employed for facilitating the separation of the fibre from the outer bark and the woody part of the stalks, it would speedily undersell all other fibres, as from four to five crops of fibre can be obtained within the year from the same plants.

Identity of Rheea with Chú-ma or China Grass.

The Rheea fibre, though a new import from Assam, is well known under another name, being identical with the highly valued article of commerce, known by the name of *China Grass*, the Chú-má of the Chinese, and from which the famed grass-cloth of China is manufactured. The proof of this identity is very complete. One of the educated Chinese introduced into Upper Assam, on account of the tea manufactory there, recognized the *Rheea* as identical with the *Chú-má* of his own country. The Rheea of Assam had been ascertained by Botanists to be the same plant as the *Urtica tenacissima* of Dr. Roxburgh, who, half a century ago, was informed by a friend at Canton, that the plant which he had obtained from Bencoolen, as the *Caloee* of Sumatra, and to which he gave the above botanical name, was that from which the Chinese Grass-cloth was made. Lately Dr. MacGowan settled at Ningpo, sent specimens of the *Chú-má* to Calcutta.* These Dr. Falconer found to be the same plant as the *Boehmeria nivea* of

By Botanists.

* These were sent on the requisition of the Agricultural and Horticultural Society of India. (See Journ. Vol. VII. p. 18.) The Society took up the subject most earnestly in 1845, and did not rest till they had ascertained, beyond a doubt, the identity of the "Rheea" of Assam, with the "China grass" plant.—Eds. *Journ. A. and H. Society of India.*

Botanists, described under the name of *Urtica tenacissima* by Dr. Roxburgh. Sir W. Hooker had also identified these two plants as being identical, and has described the former as yielding what is called *China Grass*. Further, manufacturers in this country have found the two fibres to be the same for all practical purposes.

By Manufacturers.

In Assam, Rungpore, and Dinagepore, this plant seems to be very generally cultivated, though only in small quantities, by the dooms or fishermen, near their huts. Manure is useful, moisture essential for quick growth, as well as shade, and some protection from storms, in order to allow it to grow to the height of eight feet, from which a six feet fibre may be separated. Hence it is most common, and succeeds best in the districts along the foot of the hills. It is grown from the separated roots, and may be cut down several times in the year, so that four or five crops may easily be obtained during the year, and the aggregate produce of an acre of ground be about twelve maunds. The different crops vary in strength and fineness, the earlier being the stronger, and the later finer. The officers of the above districts, as well as others, state that the culture is perfectly understood, and that it is susceptible of easy and rapid extension, if the cultivators had any other inducement than their own requirements to grow it. The expense seems to be about 5 rupees a maund. For Major Hannay, referring to the fact of £20 a ton having been offered for any quantity in Calcutta, observes that "as it costs at least 5 rupees per maund, you will see that it can scarce be sent to Calcutta at the price offered." But he also says, that "if any cheaper method of separation from the stalk could be discovered, it would undersell all other fibres."

Culture.

Various attempts have been made to make this fibre more generally known, and to bring it into demand as an article of commerce. Thus Dr. Roxburgh having obtained four plants from Bencoolen in the year 1803, wrote that "some thousand plants have been reared from these four, so readily does it grow and multiply;" and also, that it was one of the strongest fibres he had met with. In the year 1811, Dr. Buchanan sent three bales of the fibres from the Botanic Garden at Calcutta to the Court. These were sent to Messrs. Sharp, of Mark Lane, who reported that a thread spun of this fibre bore 252 lbs., whereas the weight required to be borne by Russian Hemp of the same size, in His Majesty's Dock Yards, was only 84 lbs. The Society of Arts, in the year 1814, awarded a medal to Captain J. Cotton, of the East India Company's Service, for the introduction of this fibre. It has frequently been sent by Colonel Jenkins and the officers employed in Assam to the Agri-Horticultural Society of Calcutta, in whose transactions several accounts of it have been published. Mr. Henley, late of Calcutta, informs me, that he readily collected two tons of it in the

Various attempts to introduce it into commerce.

1803.

1811.

1814.

district of Rungpore, but that on sending it to this country, it sold at a loss, being unknown. Samples were sent by Major Hannay, Captain Reynolds, Baboos Deenanath and Lokenath to the Exhibition of 1851, when honorable mention was made of their efforts. Prize medals were awarded to Messrs. Marshall and Messrs. Hives and Atkinson of Leeds, and to Messrs. Wright and Co. of London, for their several preparations of China Grass; also to M. Weber of Java, for some beautiful fibre sent by the Singapore Committee as the produce of a plant which he calls *Boehmeria candicans*, but which is probably only another name for the *Ramee* of the Malays, which is cultivated there by the Dutch, and its fibre introduced into Holland. Four gold medals have been awarded to Messrs. Meerburg, of Leyden, for specimens of sail-cloth, ropes, cables, &c.: also for some finer kinds of cloth and table cloths: it is used by the Natives of the countries which have been mentioned for making nets and fishing-lines: also stout cloth and some of finer fabric.

1851.

Sent from Java.

Major Hannay, who has long paid attention to this fibre, and to whom much praise is due, was induced to send the present samples of the Rheea fibre, (the *Dom Rheea* of the Assamese,) with some grown by Captain Dalton, in consequence of applications from this country by merchants who, however, offered a sum (£20 a ton in Calcutta)* which would not pay the expenses, and which moreover did not appear to be equivalent to the value of an article acknowledged to be identical with China Grass, which sells for £60, £70, and £80 a ton in this country.

Distribution of, and reports on the Bales now sent from Assam.

Since the arrival of specimens, I have endeavoured, to make the fibre known and its value appreciated. I sent specimens of both the Rheea and the Wild Rheea to the Society of Arts, and published an account in their Journal of the 9th December. I sent specimens, and wrote to Messrs. Marshall of Leeds, and to the Commercial Association of Manchester, have frequently seen Mr. Sangster, as well as brokers and others, on the subject, and have likewise sent specimens to Belfast and to Paris.

The letter of Mr. Marshall is most satisfactory, as he is himself a spinner of the finest yarns, and the largest consumer of China Grass. He acknowledges that the Rheea fibre is identical with it, and should class it with the middle or coarse quality, and that it is worth from £48 to £50 a ton in England; also, that it appears to be clean and regular in colour, and free from dead fibres, which are often a great detriment; that it "is a useful quality of fibre, of which we could take a regular supply," and that "it would be of considerable advantage to obtain a

Report by Mr Marshall of Leeds.

* This may, perhaps, be accomplished hereafter, under the influence of great competition; but, at present, twice £20 a ton in Calcutta would not, it appears, pay the expenses.—Eds. *Journal A. and H. Society of India.*

supply from Assam," as a nearer market than China; and "if it could be supplied at lower rates than I have mentioned, that would of course much encourage the consumption of it in this country." Of the Rheea fibre sent to the Exhibition of 1851, Mr. Marshall says, "It is the same as the above, but coarser in quality." Messrs. Wright and Co. had already come to the same conclusion, that for all practical purposes, the Rheea of Assam is the same as the China Grass. Mr. Dickson, of Deptford, to whom I have given specimens, says, "It is a splendid fibre, and when dressed as flax, of higher value than the sums mentioned by Mr. Marshall."

The Rheea fibre for Rope-making.

Though I have no doubt, that when the peculiarities of the Rheea fibre or China Grass are more generally known, its excellent qualities will be fully appreciated, and that it will come into more general use as a rival to the finer kinds of Flax, yet, at present, there are but few spinners who thoroughly understand its management, or have machinery to do it justice. It may not therefore realize its full value in the market at present. As it was desirable, therefore, to have its strength tested as a substitute for Hemp, Mr. W. Cotton has been good enough to have the bale of Rheea fibre, and also that of the Wild Rheea, tarred by the warm register, and twisted into five-inch rope, and carefully tried with respect to the strength of each. I am happy to state that the experiments which I this day witnessed were most satisfactory, neither rope breaking until the Rheea fibre bore above 9 tons weight, and the Wild Rheea nearly as much. The result of the experiments are stated in the accompanying Memorandum. Mr. W. Sangster had some of the Rheea fibre, which he had received from Assam, also twisted into small rope. It was pronounced by Messrs. Hunter, by whom it was made, 50 per cent better than similar rope made with Russian Hemp. A small portion has also been made into fishing-line, which has been described as being wonderfully strong. Though it is to be hoped that the Rheea or *Dom Rheea* fibre will prove too valuable to be only employed for rope-making, the Wild Rheea or *Bon* Rhea, on the contrary, is well calculated for this purpose. No information is given respecting the plant yielding it, but it is no doubt one of the nettle tribe, and from being called *Bon* or Jungle Rheea, it has been inferred that it may be the Rheea in a wild state. But though we have no proof of this, it is satisfactory to find that Major Hannay describes it as "uncultivated, but very common in all parts of the province;" and again, "common in most of our forests." By proper management any quantity of young shoots can be obtained, and as the divided roots afford numerous shoots, and the plant can be propagated by slips as well as by seed, its cultivation for its fibre might be carried on with facility. He further says that he had paid 5 rupees a maund for it, and that "it is cultivated largely by the hill tribes on the

Tested at Messrs. Huddart's.

By Messrs. Hunter.

Bon-Rheea or Jungle Rheea.

Jungle or Wild Rheea.

North-west of Yunan, and by the Singpoos and Dhounneas of our own North-east frontier, to a small extent only, for a coarse cloth, but chiefly for nets. It is recognized by the Nepalese as the Leepeeah of Nepal." Captain A. Thompson, of the firm of Thompson and Co., Rope Makers, of Calcutta, says of it, that "it is all that can be desired for either canvas or lines, and only requires to be known to be generally used for that purpose."* It has been valued as being worth about £35 a ton in this country, when made into a five-inch rope at Messrs. Huddart's works, it absorbed 1-7 of tar, and did not break until it bore nearly 9 tons weight.

Opinion of Captain Thompson.

There are several other fibres, some probably of equal value, to be found in abundance along the hills from Assam to near the Sutlej, as for instance, the† Pooah fibre yielded by *Boehmeria frutescens* and others, but I notice particularly only the two which have been now sent in sufficient quantity to have their properties satisfactorily ascertained.

Other Fibres.

In the accompanying Memorandum, the‡ strength of some of these fibres in the plain untwisted state, has been ascertained with samples of the same length and weight. By this it will be seen, that the Rheea fibres bore very heavy weights in their untwisted state, and that three others are at least equal to Russian Hemp, and the Kote Kangra Hemp far stronger than any thing that has yet been tried. It is at the same time liked for its colour and texture, and would be certain to be employed for all the purposes for which the best Hemp is required, if it could be procured. It is therefore included with the two Rheeas in the present recommendation. The Jubbulpore Hemp is being extensively cultivated by Mr. Williams, and already established as an article of commerce in India, and highly esteemed by good judges in this country.§

Their Strength.

The Wukka Nar might be exported from Travancore, and the Mūddár or Yercum fibre from different parts of India,

Having ascertained, in a satisfactory manner, that the fibres in question are possessed of the requisite degree of strength, and the Rheea fibre of fineness in addition, the next point to determine is, how to make their good qualities so known in

Best mode of making them known in English Markets.

* See *Journal* A. and H. Society of India, Vol. VI, p. 184.—Eds.

† See an account of this fibre in *Journ.* A. and H. Society of India, Vol. VI, pp. 135 and 240. —Eds.

‡ See Table at end of paper.

§ In a letter dated April, 1855, to the address of the Secretary A, and H.Society of India, Mr. Williams states that the price he obtained for this Hemp in England was £28 per ton, which, sum scarcely covered his expences: and he observes, "as I get a more remunerative price, for all I can grow, from the rope-makers in Calcutta, it is not my intention of shipping any more till the cultivation has been greatly extended in these Territories, which of course, will be the work of years, as I have no one but the Hill tribes (the Gonds) to carry on the cultivation."—Eds.

the market, that if sent for sale, they may not be condemned as new things, and pronounced of "no value." I am informed by the best judges, that having taken the best means to determine the real value of these fibres, they must next be sent into the market for three or four years, and in sufficient quantities, to attract the notice of respectable manufacturers, and induce them to give these fibres a fair trial. For this purpose, I am told, that from ten to twenty tons sent annually into the market, for three or four years, would be sufficient: others say that this quantity should be sent twice a year. But in the case of India, such quantities being sent from different districts would arrive at different times, and have the same effect. The time, it may be observed, is extremely favorable for such an experiment, from the high price of Russian Hemp. This I am told will not come down to its ordinary price for two years, if the supply of money from this country is stopped for even this season.

Ten or twenty tons to be sent to market for three or four years.

The next difficulty is to induce the Natives of the districts containing these valuable fibres to extend their ordinary cultivation of the Rheea or of the Hemp, or to collect the Wild Rheea in increased quantities, and to prepare them all as carefully as possible for the English market The Officiating Commissioner of Revenue in Assam, recommends that as the culture of the Rheea fibre is sufficiently well understood, "the best way to encourage its extension would be to secure to the ryots a sure market at remunerating prices." Captain Dalton, Collector of Debrooghur, states "that the best method would be for Government to offer a premium of so much a ton on all that is produced for three or four years." Both recommendations might be united in one, if the officers who take so zealous an interest in the improvement of their districts, were authorized to purchase, (unless they find individuals willing to do so,) from ten to twenty tons of these fibres in their respective districts, and perhaps in some cases awarding small prizes, or some kind of khelah, as is done in Scinde.

Inducement for Natives to cultivate.

In issuing directions, as well as in making purchases, great care should be taken that the fibres were carefully and cleanly prepared, and if intended for rope-making, and as a substitute for Hemp, the Bon or Wild Rheea should be made to resemble as closely as possible the specimens of Petersburgh Hemp, which Mr. W. Cotton has been good enough to send for transmission to India. The improved appearance of the Rheea fibre sent by Major Hannay is owing to specimens sent out to him by Mr. W. Sangster; others cannot do better than follow Major Hannay's example, as there is every probability of establishing the best specimens of the Rheea fibre as a substitute for China Grass, when much higher prices would be realized than as a substitute for Hemp only. I would include in this direction for the purchase of Rheea and of Wild Rheea fibre in Assam, also the districts of Rungpore and of Dinagepore, for the Rheea fibre, where this fibre, as stated, is cultivated under the name of *Kunkhoora*, and where

Fibres to be carefully prepared.

Mr. Henley informs me, it might very easily be collected, and its culture extended.

The true Hemp cultivated in the Himalayas.

The Himalayan districts of Kemaon, Garhwal, and of Kote Kangra, abounding as they do in true Hemp of the finest quality, might also be encouraged to extend the culture of this plant, which they already cultivate, both on account of its fibre and for the different preparations of Bhang. The fibre is sold among themselves for 2 rupees for 82lbs., or about 5*s.* a cwt. The late Lord Auckland, when Governor-General of India, calculated that at the native rates it might be landed in Calcutta for £7-16 a ton, and Hempseed for £6 a ton.* But as it is doubtful whether the natives would be induced to increase the cultivation for the prices at which they sell the Hemp among themselves, it is necessary to notice the extent of the advance which it may be necessary to make in order to produce this effect. Major Corbett says, that when Mr. Rutherford formerly purchased Hemp, that is, probably before the year 1812, it was deliverable at Chilkeea at 4 rupees a maund, at which price he thinks it could be procured (in 1841); and he states that if the culture were to be revived, "it would be cheaper and more satisfactory to the cultivators to have the advances made direct into their hands." He gives three estimates of the price, including all expenses, at which Hemp could be delivered in Calcutta from Kotedwara, Chilkea, and Sunnea, the average of which is £15·2 a ton.† Captain Kirke, giving 5 rupees a maund for the Hemp at Deyra Dhoon, calculated that it could be delivered for about £17-14 a ton.‡

The true Hemp.

Cost, delivered in Calcutta.

In making advances for cultivating Hemp, it is absolutely necessary to call the attention of the Natives, not only to the culture, but to the preparation of the Hemp. The culture seems to be very well understood in many parts of the Hills, as they carefully prepare and usually manure the ground, thin the plants to within three or five inches, and cut the male plants, "*phoolbhanga*, which flowers but has no seed," a month or six weeks before the female plant, "*goolanga* or *ghoolbhanga*," which has seed, the latter being cut about the end of September. As the preparation is also understood, the cultivators should be required to do this in their best way, so as to produce a clean and uniform article in long lengths, without twisting or platting the ends up in any way, and to resemble the Petersburgh Hemp, of which specimens are sent, as nearly as possible.

Preparation of Fibre.

The Hemp sent by D. F. Macleod, Esq., as the produce of Kote Kangra, having been highly approved of in this country, would no doubt sell well if sent to market. It is desirable

Kote Kangra Hemp.

* See *Journ. A. and H. Society of India*, Vol. I, p. 41, where will be found several useful and interesting particulars on the subject.—Eds.

† See *Transactions A. and H. Society of India*, Vol. VIII, p. 278.—Eds.

‡ *Journ.* Vol. I, p. 43.—Eds.

therefore to send a sufficient quantity to have its properties more extensively tested, and its value established in the English market.

Though it will no doubt be necessary in some cases to increase the original price of these fibres, as in the case of the Hemp, or perhaps of the Rheea, for a time, so that when more extensively cultivated its cost shall have been ascertained, it is to be carefully kept in view, that any great increase of price in the articles will prevent their becoming permanently established as articles of commerce, as that would interfere with the profits of all those engaged in the transaction. Though the price of all fibres is at present high, it is uncertain how long this may continue, but it may be safely assumed, that if care be taken to make their superior quality known to proper Hemp brokers, that all which have been mentioned will come into competition with the best kinds of Hemp, and sell for about £35 a ton.

The best Rheea fibre, if well prepared, ought to bring a higher price.

EAST INDIA HOUSE: (Signed) J. FORBES ROYLE, *M.D.*
13*th Feb.*, 1854.

Fibres tested at the Military Stores. *lbs.*

Petersburgh Clean Hemp, ...	160
Jubbulpore Hemp, ...	190
China Grass, ...	250
Rheea Fibre, ...	320
Wild Rheea, ...	343
Kote Kangra Hemp, (no breakage at)	400
Wuckoo-nar Fibre, ...	175
Yercum or Ak or Mudar Fibre	190

Clean samples of all the above fibres were taken of equal weights, and firmly tied at their ends, so as to be of equal lengths at the India House, and their strength tried in the usual way by Mr. Hull, in the Military Stores, 16th December, 1853.

Experiments at Messrs. Huddart and Co's. Rope Manufactory, Limehouse, 13th February, 1854. Experiments on strength of Rope made from Samples of Rheea and Bon Rheea Fibre from Assam, received from the East India House.

Description of Hemp.	Size of Rope.	No. of Yarns per Strand.	Total No of Yarns in Rope.	Strength of Rope in Pounds.	Strength of Rope per inch Circumference squared.	Size of Rope at breaking.	Tar absorbed,	Amount of stretching.
	In.							
Wild Rheea, 1st Experiment, ...	4 7/16	44	132	19032	*844	4 3/16	1-7th	1 in 16
Ditto 2nd ditto, ..	4 7/16	44	132	20124	*894	4 3/16	1-7th	1 in 16
Rheea Fibre, ...	4 7/16	44	132	20488	*910	4 3/16	1-9th	1 in 16

* The average strength of Rope made with the best Hemp, and after numerous experiments, from 1803 to 1808, is 805.

The Preparation of the Rheea Fibre.

The preparation of the fibres is tedious, and is what causes the difficulty of sending the fibre at a cheaper rate into market. Major Hannay writes, "When the stalks have become brown for about six weeks above the roots, the top is seized with the left hand, and the leaves are stripped off by passing the right hand to the ground, near which the stalk is cut. The outer bark has first to be scraped off with a blunt-edged knife, when the exposed fibre still attached to the woody part of the stalk is exposed to the hot sun to dry. On the third morning, after being exposed to the dew for several hours, the fibre is drawn off. This is done by breaking (beating) the woody stalk right through towards the thicker end, and then separating the fibre therefrom, drawing it off slowly towards the small end, and repeating the process as often as necessary, though much of the fibre remains, and may be taken off at a second breaking." (The fibres now require to be carefully washed, *Henley.*) "The hanks of fibre are then separately twisted at the upper end and tied up in bundles. When the threads are required for spinning, they are prepared by drawing the single hanks several times with a blunt-edged slip of bamboo held in the right hand, when they are easily opened out to the required fineness with the fingers and thumb nails. This is certainly a rude and tedious process." Hannay says that "the Indo-Chinese method of separating the fibre is the quickest, the least expensive, and one which occasions little loss in the operation." Dr. Mac-Gowan, of Ningpo, states that "in China the last cutting is made in September, from which the finest cloth is made, the first being inferior, coarse and hard. On being cut, the leaves are carefully taken off on the spot; the stalks taken to the house and soaked in water for an hour. In cold weather the water should be tepid. After this the plant is broken in the middle, by which the fibrous portion is loosened and raised from the stalk. Into the interstice thus made, the operator thrusts the finger nails and separates the fibre from the centre to one extremity and then to the other. The stripping process is very easy. The next process is scraping the Hemp, to facilitate which the fibre is first soaked in water. The strips of Hemp are drawn over the blade of a small knife or scraper from within outwards, and being pressed upon by the thumb, the fibrous portion of one surface, and the mucilaginous part of the other, are thus taken off. The Hemp is then wiped dry, and the whitest selected for fine cloth. It is afterwards bleached."*

The directions for peeling the Chú-má in China are given as follows, as translated from the Chinese:

Peeling the Fibres of the Tchou-ma.

When the stems are all got in, they are split longitudinally with knives of iron or of bamboo. The bark is first removed, then the lower layer (which is white, and covered with a shrivelled pellicle, which comes off by itself) is

* See *Journal A. and H. Society of India*, Vol. VI. p. 214.—Eds.

scraped off with a knife. The interior fibres are then seen ; they are to be removed and softened in boiling water. If the *Tchou-ma* be peeled in winter, the stems must be previously steeped in tepid water, in order that they may be the more easily split.

The first layer of *Tchou-ma* is coarse and hard, and is only good for making common materials ; the second is a little more supple and fine ; the third which is the best, is used for making extremely fine light articles.

Introduction of Bombyx Cynthia into Malta and Italy.

[The *Bombyx Cynthia*, or *Phalæna Cynthia*, is the *Eria* of Assam and the Eastern districts of Bengal. It has engaged the attention of the Agricultural and Horticultural Society of India for many years, and several notices of it are recorded in their *Transactions*. With the view of promoting the discovery of an efficient method of bringing the substance prepared by this worm into use as an article of commercial value, the Society, in conjunction with Capt , (now Col.) Jenkins, the Commissioner of Assam, offered in 1839, the sum of £ 60 and a gold medal to the discoverer of an effectual and cheap solvent for the adhesive material which attaches to the cocoon. Though this prize was before the public for upwards of seven years, no claimant for it appeared, and the amount was diverted to another purpose. It is gratifying to learn from the following extract, that the attempt to unwind the silk from the cocoon has proved so successful.—*Eds. Journ . Agr. & Hort. Society of India.*]

Mr. Westwood exhibited a sample of the silk produced at Malta from cocoons of *Bombyx Cynthia*, which sample was given by the Governor, Sir William Reid, to Dr. Templeton, and by him forwarded to Mr. Westwood with the following letter :—

" *Valetta, 10th November*, 1855,

" My Dear Westwood,—I take advantage of the Governor's kind offer to send you the enclosed silk, unwound, from the Cynthia cocoons by Signor Lotteri, an Italian, skilled in silk-winding, who declared that his fingers stuck together for a very long time afterwards, so gummy and resiny was the binding matrix of the silk. The result seems very fine, and is, I believe, very strong, in comparision with silks of similar thickness. At Casal Zebbourg, a gentleman introduced from the Governor's gardens some of the worms, got little boys to tear the cocoons to pieces, and native women to spin it, and there is now hanging, in the window of Mr. Goodenough's shop, a pair of stockings, and some lace-work made from the spun silk. The stockings have a muddy look, the colour of the enclosed, but in other respects appear fine substantial affairs, such as country people would be glad to get ; and I believe they are everlasting. The great business is to get a machine to tear the cocoons to pieces, and that will soon follow, I presume. They have got the worm now into Tripoli in a fine healthy state ; and planting castor-oil plant is now the order of the day every where.

"I trust the packet of live cocoons arrived safe, which were sent to you by the Governor's directions, per last mail. His Excellency was much pleased by the note in the *Athenæum* respecting them.

"Very truly yours,
(Signed,) R. TEMPLETON."

Mr. Westwood added that he had received the cocoons referred to, and found that some at least of the pupæ inclosed were alive, notwithstanding the long journey, and the change of temperature to which they had been subjected.

The Secretary read, from the *Journal of the Society of Arts*, November 10, the following extract from a despatch forwarded by Governor Sir William Reid to his Grace the Duke of Newcastle :—

"We have here in Malta gone through all the operations as practised in Assam, except weaving the silk thread into cloth. For this we have not yet a sufficient quantity ; but the worms are breeding here faster than we can rear the castor-oil plant, they are now (in October) thriving in the open air, and as they consume the leaves of the castor-oil, they travel from plant to plant, feeding upon several, but apparently doing well only on the *Ricinus*.

"The French Government have applied, through their Consul, for a larger quantity of eggs, both for France and Algeria, and I have been enabled to supply him with as many as he requires.

"In consequence of statements published in the *Journal of the Society of Arts*, I have had an application from the Agricultural and Horticultural Society of Grenada, in the West Indies, for eggs of this silkworm. Some fresh cocoons will be sent from hence to Grenada, and I am not without hope, from the way in which they are being conveyed, and with the assistance of the Directors of the Royal Mail Steam Company, that eggs in a sound state will reach the West Indies."

The Secretary also read the following extract from the *Turin Gazette*, inclosed in the above-mentioned despatch : —

"*Culture of Silk in Piedmont.*—Sig. Vincenzo Griseri the first person who has undertaken the rearing of the *Bombyx Cynthia* worm upon leaves of the castor-oil plant, and the first who introduced it into France, has now terminated his second experiment of rearing the said worms. Sig. Griseri, conceiving the great service that these valuable insects might render in the production of silk, diligently distributed them to the various provinces of the state, as also in Brianza, and has received from all quarters accounts of a successful result. He succeeded last spring in rearing these worms even upon the castor-oil plants, while in the ground, and in the open air, in the garden of the Chemical Laboratory, under the observation of Chevalier Cantu, Director of that establishment, the Minister, Conte

de Cavour, His Excellency the Duke of Guiche, Minister Plenipotentiary of France, Professors Abbenne and Borsarelli, and many other distinguished personages. From this mode of treatment, Signor Griseri discovered that these worms do not suffer from a low temperature, nor from strong winds, nor from continued rain; but, on the contrary, he obtained finer and better formed cocoons than those produced by the ordinary method, all which circumstances have been submitted to the Royal Academy.

After the first experiment he published, through the printers Chirio and Mina, the mode of bringing up these worms. In the second experiment he also fully succeeded, and found that the cocoons were superior to those brought from Calcutta and Malta, on which account he came to the conclusion that this new silkworm, a native of Bengal, has found its own climate in our country. An experiment is now being made as to the mode of extracting the silk, which has been confided to the care of able throwsters, and from some samples already produced it results that this silk is finer and more elastic than our common silk; further, two more important facts have just been communicated by Sig. Griseri, namely, that he has succeeded in feeding these worms exclusively upon willow leaves and lettuce leaves, and has obtained cocoons similar to those produced from the leaves of the castor-oil plant. During the experiments, Sig. Griseri, was assisted by the Countess Marianna Antonini, an experienced producer of silk, and Sig. Francesco Comba, a distinguished naturalist, who kindly offered him their aid and advice. Sig. Griseri intends next spring to try the rearing of our native grubs, the *Pavonia major*, and the *Pavonia minor*, which feed upon various wild plants, and yet produce silk, as he has already confirmed this by experiment. There is reason to believe from these experiments made by so celebrated a silk-grower, well known by the numerous services he has rendered in rearing and improving the race of silkworms, that the culture of silk will receive a development, the limit of which can hardly be foreseen, as the object is nothing less than to convert the vegetable matter of the most common leaves into the valuable substance of silk."

(Proceedings of the Entomological Society, for Dec., 1854.)

On the Culture of Flax in the North-West Provinces, for the sake of its Fibre: by Dr. Jameson.

To the Commissioner of N. W. Provinces.

Dated Agra, 12*th January*, 1855.

Revenue,
Present, R. K. Dick, Esq.,
Officiating Member.

Sir,—I am directed by the Sudder Board of Revenue to enclose lithographed copies of the correspondence noted in the margin for the information of yourself and

Government order, No. 2571 A of 1854, dated 20th December; enclosures of Do., viz., Report, Superintendent Botanical Gardens, N.W.P., to Government No. 634 of 1854, dated 9th December.

Government order No. 2570 A of 1854, dated 20th December,

the Collectors of your division, regarding the cultivation of flax in India.

2nd. The Board request that attention may be directed to the subject, and should any experiment be made in your division, that its nature and results may be reported.

I have, &c.,
H. W. Hammond,
Officiating-Secretary.

No. 2571 A of 1854.

To G. J. Christian, Esq.,
Secretary, Sudder Board of Revenue, N.W.P.

Dated Camp, Lullutpore, 20*th Dec.*, 1854.

Revenue Department.

Sir,—I am desired to forward for communication to the local authorities, copies of the correspondence noted in the margin, regarding the cultivation of flax in India in Suharunpoor and Dehra.

From Superintendent Botanical Gardens, dated 9th December, No. 634, to ditto of this date.

I have, &c.
(Signed,) W. Muir,
Secretary to Government N.W.P.

No. 634.

To William Muir, Esq.,
Secretary to Government N.W.P., Agra.

Dated Suharunpoor, 9*th Dec.*, 1854.

General Department.

Sir,—I have the honour to acknowledge the receipt of your letter No. 4521, dated 17th ultimo, with enclosures.

As the season for sowing flax had arrived, and as any delay in making references would have probably rendered it impossible to try an experiment this season, I at once made arrangements to sow eight acres at Suharunpoor and then proceeded to Dehra, and selected ten acres of land for an experiment there. This land is now partly sown, and the remainder will be finished in a few days, and I trust that my proceedings will meet with the approval of the Honorable the Lieutenant-Governor.

That the Upper Provinces are admirably adapted for the growth of flax I am confident, from the experiment made by me on a small scale for several years. In 1851, I received a quantity of flax seed from Russia, which has been grown in the garden, and extensively distributed.

The late overseer, Mr. Kane, a native of Belfast, where flax is extensively grown, and in which trade he had been engaged, declared that the produce

of Suharunpoor was equal to any thing that he had seen in his native country. Of this seed I sent a quantity to Lahore last season, where it was tried, and the fibre prepared by a European, and the report made on this experiment by parties in Calcutta* was deemed so satisfactory by the Agri-Horticultural Society of Lahore, as to induce them to recommend to Government that rewards be offered for the largest quantity grown, and at the same time that all the seed and fibre, fitted for the manufacture be purchased at a certain valuation, which Government sanctioned. Such encouragement has been attended with the most beneficial results, as large tracts in the Bareo Doab, have been brought under cultivation with flax ; but it remains to be seen whether the fibre produced from plants raised from native seed, will be fitted for the purposes of the manufacturer. It is true, as stated by Dr. Royle in his memorandum, that flax has been cultivated in India from time immemorial for the oil yielded by the seed, and it now remains to be seen whether the same plants if properly grown, and carefully prepared, will yield you a fibre fit for mercantile purposes, and that too at a cost sufficiently low to reward the grower. Up to this time natives have considered the fibre useless. That the flax prepared from imported seed will do so, I do not for a moment doubt, and if failure attends the extensive experiments now being tried, I would recommend the introduction of Belgian or Russian seed.

To prepare the fibre for the manufacture is a delicate process, and all that can therefore be attempted by us is the rotting process, or separating the fibre from the stem, and leaving the heckling to the European manufacturer. But whether this can be done with profit also remains to be seen, as it will depend on the value of the flax in the rough state. If it cannot be done, then I should beg to recommend that the Honorable the Court of Directors be solicited to depute two experienced hecklers with all the requisite implements from Ireland. We might go on blundering, and through time produce an article of value to the English market. If however this country can produce flax of a superior quality, it would, in my humble opinion, be a vast mistake to lose time in endeavouring to learn a process, when, at a small expense experienced hands might at once be procured, and at the same time the produce prepared by them would cover all the outlay incurred in procuring them. Under these men a number of natives might be placed to learn the process. At present a vast interest is at stake, the Russian markets, though closed, their produce finds exit by other channels, but still the wants of Britain in the raw material are far from supplied, and as the war progresses, we may expect to find the deficit greatly to increase, and thus cause much misery to the English manufacturer. To correct this, this country has ample means. The experiment in Bengal appears to

* See report by the Committee of the A. and H. Society of India, in the original department of this No. of the Journal.—Eds.

have failed from late sowing and drought. The latter can never occur at least over vast tracts of the North-Western Provinces as soon as the great Ganges Canal is in working order, and which of course it soon will be ; such a product could not therefore be more opportunely brought into notice.

The small experiments about to be tried here, and at Dehra, and at Jubblepoor, and other places in the North-Western Provinces, and the extensive Punjaub experiments, will, when completed, show how far flax cultivation is fitted for the N. W. Provinces.

A detailed report of the experiments conducted by me will be furnished to Government as soon as practicable.

I have, &c.

(Signed,) W. Jameson,
Supt. Botanical Gardens, N.W.P.

No. 2570 A of 1854.

To W. Jameson, Esq.,
Supt. Botanical Gardens, Suharunpore, N.W.P.

Dated Camp, Lullutpoor, 20*th December*, 1854.

Revenue Department.

Sir,—I am directed to acknowledge the receipt of your letter, dated 9th instant, No. 634, and in reply to state, that the Honorable the Lieutenant-Governor approves of the proceedings reported in para. 2, for carrying out the orders of Government regarding flax cultivation in Suharunpoor and Dehra.

I have, &c.,
(Signed,) W. Muir,
Secy. to Govt. N.W.P.

Chinese Indigo—a New Kind Discovered.

Those who read my "Wanderings in China" may remember the account I gave of a valuable kind of indigo made from a species of woad *(Isatis indigotica)*, which is extensively cultivated in the level country a few miles to the westward of Shanghae ; I have now to notice another kind, equally valuable, if not more so, which is made from a species of *Justicia*, or from a plant of that natural order to which *Justicia* belongs. This kind is largely cultivated in the hilly country near Ningpo, or rather in the valleys amongst the hills. It seems to be easily cultivated—it grows most luxuriantly, and is no doubt very productive. Having evidently been introduced from a more southern latitude, it is not hardy in the province of Chekiang, any more than cotton is about Shanghae ; but nevertheless it succeeds admirably as a summer crop. It is planted in the end of April or the beginning of May, after the spring frosts are over, and it is cleared from the ground in October.

During this period it attains a height of a foot or a foot and a half, becomes very bushy, and is densely covered with large green leaves. It is cut before any flowers are formed. The Chinese method of preserving plants for next year's crop is most ingenious and well worth notice. I have already remarked that it is a tender plant, and consequently the roots left in the ground after the gathering season are all destroyed by the first frosts of winter. But the Chinese do not depend upon these for the next year's crop ; nor do they take them up, or cover them in any way, but simply leave them to their fate, after having done their duty for one year. Cuttings are found to be much more vigorous and productive than the old roots, and to the preservation of cuttings the Chinese cultivator directs his attention. When the stems are cut for the manufacture of Indigo, a large quantity of them have their leaves stripped off and are afterwards taken into a house or shed to be properly prepared. The leaves thus stripped from the cuttings are thrown into the tanks with the other stems and leaves, so that nothing is lost except what is actually required for the purpose of propagation. The stems are now tied up firmly in large bundles, each containing upwards of 1000, and the ends of each bundle are cut across, so as to leave them perfectly neat and even, both at top and bottom. These bundles are each about a foot long, and, of course, nearly round. Having been thus prepared, they are carried to a dry shed or out-house, where, in some snug corner, they are packed closely and firmly together, and banked round with very dry loam. A portion of the dry soil is also shaken in between the bundles ; and this being done, the operation is complete. Should the winter prove unusually severe, a little dry straw or litter is thrown over the surface of the cuttings, but nothing else is required. During the winter months, the cuttings remain green and plump ; and although no leaves are produced, a few roots are generally found formed, or in the act of forming, when the winter has passed, and the season for planting has come round. In this state they are taken to the fields and planted. The weather during the planting season is generally showery, as this happens about the change of the monsoon, when the air is charged with moisture. A few days of this warm showery weather is sufficient to establish the new crop, which now goes on growing with luxuriance, and requires little attention during the summer—indeed none, except keeping the land free from weeds. In the country where this dye is grown, there are numerous pits or tanks on the edges of the fields, they are usually circular in form ; and one which I measured was 11 feet in diameter, and 2 feet in depth. About 400 catties* of stems and leaves are thrown into a tank of this size, which is then filled to the brim with clear water. In five days the plant is partially decomposed and the water has become lightish-green in colour. At this period the

* A Chinese catty is equal to 1⅓ lbs.

whole of the stems and leaves are removed from the tank with a flat-headed broom made of bamboo twigs, an admirable instrument for the purpose. When every particle has been removed, the workmen employed give the water a circular and rapid motion with the brooms just noticed, which is continued for some time. During this part of the operation, another man has employed himself in mixing about 30 catties of lime with water, which water has been taken out of the tank for the purpose. This is now thrown into the tank, and the rapid circular motion of the water is kept up for a few minutes longer. When the lime and water have been well mixed in this way the circular motion is allowed to cease. Four men now station themselves round the tank and commence beating the water with bamboo rakes made for this purpose—the beating process is a very gentle one. As it goes on the water gradually changes from a greenish hue to a dingy yellow, while the froth becomes of a beautiful bright blue. During the process the head workman takes a pailful of the liquid out of the tank and beats it rapidly with his hand. Under this operation it changes colour at once, and its value is judged of by the hue it presents. The beating process generally lasts for about half an hour. At the end of this time the whole of the surface of the tank is covered with a thick coating of froth of the most brilliant colours, in which blue predominates, particularly near the edges. At this stage, it being desirable to incorporate the froth with the liquid below it, I witnessed a most beautiful chemical operation which took me completely by surprise, and showed how universally must be the knowledge of the effect of throwing "oil upon the waters." A very small portion of cabbage-oil—only a few drops—was thrown on the surface of the froth, the workmen then stirred and beat it gently with their flat brooms for a second or two, and the whole disappeared as if by some enchanter's wand. And so small a quantity of oil was necessary for this purpose that even when the cup had been emptied, and had only the oil that was necessary adhering to its edges, it was thrown into another tank, and produced the desired effect. The liquid, which is now darker in colour, is allowed to stand quiet for some hours, until the colouring matter has sunk to the lower stratum. when about two-thirds of the surface is drawn off and thrown away. The remaining third part is then drawn into a small square tank on a lower level, which is thatched over with straw, and here it remains for three or four days. By this time the colouring matter has separated itself from the water, which is now entirely drained off—the dye occupying 3 or 4 inches of the bottom in the form of a thick paste, and of a beautiful blue colour. In this state it is packed in baskets and exposed for sale in all the country towns in this part of China. What its intrinsic value may be when compared with the indigo of commerce, I have no means of ascertaining, but it is largely used in this part of the world, where blue is the most fashionable colour, judging from the dresses of the people,

and it is possible that with our knowledge of chemistry a colour of this kind might be greatly improved. After being grown and manufactured as I have described, it is sold at rates varying from 50 to 100 cash a catty, say from 2*d.* to 4*d.* per lb. Some is sold as low as 30 cash, but this is very inferior ; the greater part produced is sold from 60 to 80 cash a catty, and it must be of a very superior quality if 100 cash is paid. Like the Shanghae Indigo made from *Isatis indigotica*, it is called "Lien-ching" by the Chinese. I have just sent a large supply of the cuttings above described to the Agricultural and Horticultural Society of India, and hope the plant may prove of some value in a country where the Indigo of commerce is largely cultivated.*—*R. F.—Gardener's Chronicle, 8th April*, 1854.

Gutta Percha in India. Extract of a letter from Dr. Hugh Cleghorn, Madras, to Professor Balfour, dated 13th January, 1855.

"Three days ago, my friend Colonel Cotton, of the Madras Engineers, sent me a piece of Gutta Percha from the Wynaad, with a twig of the tree producing it, which is a true *Isonandra*. I have on the table both the gum elastic and the branchlet, abundant proof of the important discovery. It is believed that the tree grows abundantly in Malabar, I have requested that a diligent search should be made. As telegraphic lines stretch across our Peninsula, the importance of the discovery can scarcely be overrated, now that the forests of Singapore are well nigh exhausted. The Government will take means to prevent a wholesale destruction in the present instance, by making the forest a royalty, or at all events placing the trees under strict conservancy. I await with deep interest further intelligence from the distinguished Engineer as to the extent of the Gutta Percha forests."—*Edinburgh New Phil. Journ., April*, 1855.

Gutta Percha of Singapore.

Of the Gutta Percha very small quantities are now brought to Singapore ; it has become a manufactured substance. A vast variety of its gum, at various prices, from three to thirty dollars a picul, is brought in by the natives. Some of these are deep red, some quite white, and many of them are hardly coherent, breaking down and crumbling between the fingers. These are cut and broken up, and cleared from the scraps of bark and wood

* The plant sent by Mr. Fortune, appears to be identical with the "Room" dye plant of Assam, a species of *Ruellia*. The Society have received specimens of the Room dye from Major Hamilton Vetch, Deputy Commissioner of Assam, which have been valued in Calcutta at from Rs. 10 to Rs. 12 per maund, or from 3*d.* to 3½*d.* per lb.—Eds. *Journ. A. and H. Society.*

which are generally found among them ; they are then boiled in an iron pan with cocoanut oil, and stirred until thoroughly amalgamated. This mixture is allowed to cool again, when it is broken up and reboiled with more oil, some times as often as four times, or until the mass acquires a certain tenacity. The good Gutta Percha sliced into thin shavings, is then added in greater or less proportion, according to the quality of the basis, and the whole well mixed. The Chinese who do this are very skilful, and manage to produce from a great variety of gums a very uniform article, wonderfully so, when it is considered that the gum is bought by the merchants in very small quantities at a time, as the natives bring it in. There seems to be great mystery about the Gutta Percha trees. I was in the heart of their country, and yet could get no body to show me a single tree. I think the fact is that they have all been long ago cut down within any reasonable distance of the settlements. I saw large quantities of the gum, though none of the best quality, on the Indragiri. I think I can distinguish at least five sorts, which are probably the produce of different trees ; or rather five classes of gums, for perhaps the species are many more, and yet, though I offered great inducements, I could not get even a leaf. Of course, if I had gone up with time at my disposal, I would have seen the trees in spite of all, for I should have gone into the woods with the Collectors, and this I hope some time to be able to do.—*Letter from James Motley, Esq., in Hooker's Journal of Botany, February*, 1855.

Monthly Proceedings of the Society.

(Saturday, the 14th January, 1854.)

W. G. Rose, Esq., Vice-President, in the chair.

Read a note from the President intimating his regret that indisposition prevented his attending the Meeting.

The proceedings of the last General Meeting were read and confirmed.

Election of Officers and Council, for 1854.

The Chairman announced that this being the Anniversary Meeting, the election of Office Bearers and Council for the current year, should be entered on. The members accordingly proceeded to the ballot, and Baboos Gobinchunder Sen, and Rajendrololl Mittra, who were appointed scrutineers, reported the result to be as follows:—

President.—The Hon'ble Sir Lawrence Peel.

Vice-Presidents.—The Hon'ble Sir Arthur Buller, Rajah Pertaub Chunder Sing, Mr. William Haworth and Baboo Gobinchunder Sen.

Secretary.—Mr. A. H. Blechynden.

Council.—Mr. A. Grote, Baboo Peary Chand Mittra, Dr. H. Falconer, Mr. W. H. Elliott, Mr. C. A. Cantor, Baboo Shib Chunder Deb, Dr. C. Huffnagle, Mr. Stewart Douglas, Mr. W. G. Rose, Baboo Ramgopal Ghose, Mr. W. Blundell, and Mr. R. M. Thomas.

Standing Committees.

The revision of the various Standing Committees was next taken into consideration. On the recommendation of the Council the names of the following Members were added to the Committees on Sugar, Coffee, Implements of Machinery, and Fruit and Kitchen Garden Committees respectively, viz., Baboo Ramgopal Ghose, Mr. Cantor, Major Abercrombie and Mr. S. Douglas; in the room of Mr. Henley, Major Fraser and Mr. George Taylor, who are absent. The names of Messrs. B. Warwick and R. M. Thomas were added to the Floricultural Committee, which required strengthening.

Elections.

The following gentlemen who were proposed at the last Meeting were duly elected members:—

Messrs. Edward Greenway; G. Berford, C. S., Richard Blechynden; Geo. Allardice, Dr. J. Fayrer, and Baboo Sham Chand Mittra.

Candidates for Election.

The names of the following gentlemen were submitted as desirous of joining the Society :—

James White Smith, Esq., of Kattulee factory, Kishnaghur,—proposed by Mr. J. F. Hedger, seconded by Mr. R. T. Larmour.

Henry Simpson, Esq., of Commedpore factory, Pubna,—proposed by Mr. James Stuart, seconded by Mr. M. Wylie.

F. C. Marshall, Esq., assistant Civil Engineer, Punjab,—proposed by Mr. R. Berkeley, seconded by the Secretary.

Charles Weskins, Esq., Merchant, Calcutta,—proposed by Mr. S. Douglas, seconded by Mr. W. G. Rose.

C. J. Montague, Esq., Calcutta,—proposed by Mr. Rose, seconded by Dr. Falconer.

Reports on various subjects.

The following Reports were submitted :—

1st. A joint report from the Floricultural Committee and Fruit and Kitchen Garden Committee, respecting the arrangements for the shows of the season. The Committees recommend that three Exhibitions be held in the Auckland Circus during the season, namely, on the 20th of January, the 25th of February, and the 14th of March,—the two latter being public holidays. The Committees suggest that, in future a show of vegetables be held in the Town Hall, earlier in the season—say about the 10th or 15th of December, combined with such descriptions of ornamental plants as may be then in flower, Dahlias, Chrysanthemums, &c. The Committees further recommend that in future, *bronze* medals be awarded to the native gardeners, in place of the present *silver* medals, with a prize in money, equivalent in value to a silver medal: and that as the Secretary has already been authorized to procure a new Die when in England, he be further instructed to arrange for a number of bronze medals (say one hundred) for the above purpose. The Committees prefer this recommendation from having been informed on good authority, that the silver medals, hitherto awarded, have been converted into money by the recipients.

2nd. From the Committee appointed at the last Meeting to determine respecting the provision of vegetable and flower seeds for 1854. The Committee recommend that supplies of vegetable seeds, be procured as last year from North America, and the Cape of Good Hope, and flower seeds from England, at a cost not exceeding Rs. 7,000, exclusive of freight and other incidental charges. The Committee suggest in reference to the disappointment experienced last year with the English flower seeds, that the next consignment be despatched later in the season, say by the 20th of September steamer, and that Mr. Carter be instructed to do so, if, by this delay, he can ensure to the Society a collection of seeds of the gathering of the

autumn of 1854. They would, however, recommend that a discretionary power be granted to the Secretary, to alter the above arrangement, should he during his approaching visit to London, deem it advisable, in consultation with Mr. Carter, to order the despatch of the consignment a month earlier, as in 1852, when the seeds gave so much satisfaction."

3rd. From the Nursery Garden Committee, recommending that a sum not exceeding Rs. 250 be authorised for the erection of another conservatory of 140 feet by 26 feet, on the plan proposed by the gardener; it having been found that the present conservatories are not sufficiently commodious. The Committee further suggest that the sum of Rs. 150 be remitted to Dr. Jameson, Superintendent H. C. Botanical Gardens N. W. P., to meet the necessary expenses of glazed cases, and carriage hire for 250 peach grafts from the Saharunpore Garden to Meerut; and that an application be made to Government for a free passage for the cases from thence to Calcutta, by bullock train and steamer.

4th. From the translation Committee announcing that they have passed through the press, the third part of the first Vol. of the "*Indian Agricultural Miscellany*" in Bengali. "The Committee have reason to believe that if a moderate price be affixed to this publication it will meet with a ready sale.They beg, therefore, to recommend that the general gratuitous distribution of the work be discontinued, and that it be sold in the first instance below the cost price (about four annas) say two annas a copy." The Committee add that they have commenced the printing of Part 4, and hope to have it out of press in the early part of 1854.

Resolved.—On the recommendation of the Council, that the above four reports be adopted.

The Gardener's monthly statement was submitted. Mr. McMurray reports that the several kinds of tuberous roots cultivated in the Garden during the past year, are now ready for lifting, and he recommends, early applications for them, such as arrow root, Jerusalem artichoke, sweet potatoe, yams of sorts, and tapioca cuttings. The English mulberry plants raised from the seed purchased by the Society in 1851, have succeeded well, and cuttings of the same are now being put down, which will be ready for distributing to members during the ensuing season. The Gardener states that the Manilla hemp plant presented by Mr. Ackland, has made a healthy growth; that a case of plants lately received from the Botanic Garden, Mauritius, has reached in tolerably good condition; that the Sea Island Cotton seed presented by Mr. Nash, at the last meeting, and the old rice from Nepal received from Sir J. Colvile, have germinated 35 and 9 per cent. respectively. Mr. McMurray closes his report with a list of contributions to the Garden during December, 1853.

The Minutes of the Grain Committee, on certain samples from Burmah, which were received from the Commissary-General in November last, were submitted.

Resolved.—That a copy of these minutes be sent to Major Ramsay.

Read a letter from Mr. S. H. Robinson, tendering his services, to conduct the duties of the office during the Secretary's absence, for Rs. 300 per mensem. As Mr. Robinson cannot devote the whole of his time to the Society he proposes giving the services of an efficient assistant, to be in constant attendance at the Society's Rooms, during office hours, at his own expence.

Resolved.—On the recommendation of the Council, that Mr. Robinson's offer be accepted, provided his assistant is approved of by the Council.

Read a letter from the Rev. J. Long, returning his thanks for the copies of the *Indian Agricultural Miscellany* in Bengali furnished to him by the Society; stating how they have been distributed; adding that "they have been received very favorably, and the style has been found suited to the capacity of the middle classes among the natives. Mr. Long applies for some further copies of the above work, to bind up for a volume and deposit in various vernacular libraries for reference, and for a grant of twenty copies of Vols. 1 and 2 of the Transactions of the Society in Bengali.

Resolved.—That Mr. Long's requests be complied with.

Read extract of letters from Lieutenant-Colonel Jenkins, and Major Hannay, on the subject of cotton cultivation at Debroghur, Upper Assam. Major Hannay is very desirous of giving a further and more extended trial to the two foreign sorts which gave such a favorable return last season, viz. the "Sea Island" and "Petti Gulph," provided he can obtain a quantity of fresh seed by July next.

Resolved.—That Mr. Landreth, the Society's Seedsman at Philadelphia, be instructed to transmit a small portion of the cotton seed ordered from him, to the Society's agents in London, to be despatched from thence by a Screw Steamer *viâ* the Cape to meet the above application of Major Hannay. Further that the tobacco seed be also sent to England and forwarded from thence by the overland conveyance.

It was agreed, on the recommendation of the Council, that the sum of £50 be remitted to Messrs. Grindlay and Co., to meet the cost of the new die, bronze medals, &c., alluded to above.

The submission of a few other communications, and several donations was deferred to the next Monthly General Meeting.

(Saturday, the 11th February, 1854.)

Baboo Gobind Chunder Sen, Vice-President in the chair.

The proceedings of the last General Meeting were read and confirmed.

The following Gentlemen, who were proposed at the last Meeting, were duly elected Members :—

Messrs. James White Smith, Henry Simpson, F. C. Marshall, Charles Weskins, and C. J. Montague.

The names of the following Gentlemen were submitted as desirous of joining the Society :—

Major James Stevens, Invalid establishment, Deyra Dhoon,—proposed by Mr. C. A. Cantor, seconded by Mr. W. G. Rose.

Capt. W. H. Lomer, 21st Regiment N. I., Sealkote,—proposed by Major H. Spottiswoode, seconded by Capt. F. C. Burnett.

Charles Horne, Esq., Civil Service, Bareilly,—proposed by the Secretary, seconded by Mr. W. Blundell.

Mr. Geo. P. Shearwood, of Calcutta,—proposed by Mr. Cantor, seconded by Mr. Rose.

Mr. R. J. Carbery, of Calcutta,—proposed by Mr. W. Cockburn, seconded by Mr. Joseph Willis.

R. G. Lord, Esq., M. D., (21st Regiment Bombay N. I.) Neemuch,—proposed by the Secretary, seconded by Capt. J. C. Brooke.

Arch. James Brown, Esq., Merchant, Mirzapore,—proposed by Mr. J. B. Higginson, seconded by the Secretary.

A communication was read from Mr. William Storm, with reference to which the following recommendation was submitted by the Council for disposal at the next Meeting.

"That Mr. William Storm be elected an Honorary Member in consideration of 'services rendered to the Society.'"

Presentations.

The following contributions were announced :—

1. Journal of the Indian Archipelago for April and May, 1853. *Presented by the Editor.*

2. A copy of the same work for the same period. *Presented by the Government of Bengal.*

3. Selections from the Records of the Government of India, No. 2, Report on the Administration of the Punjab for 1849-50 and 1850-51 : and No. 3, Sir C. Napier's resignation. *Presented by the Government of India.*

4. Selections from the Records of the Bengal Government, No. 13, Notes on the Manufacture of Salt in the Tumlook Agency, &c., &c. *Presented by the Government of Bengal.*

5. Journal of the Asiatic Society of Bengal, No. 6 of 1853. *Presented by the Society.*

6. A case of ornamental plants and fruit grafts from the Royal Botanic Garden, Mauritius. *Presented by Mr. Duncan, the Superintendent.*

These plants have reached in tolerably good condition.

7. Two pine-apple crowns of a superior description from Mauritius. *Presented by W. Storm, Esq.*

8. A further small supply of Seychelles Cotton Seed. *Presented by the Hon'ble C. J. Bayley, Colonial Secretary, at Mauritius.*

The Secretary stated that he had sent portions of this Seed to Major Hannay for trial at Deebroghur, in Upper Assam, and to Captain G. E. Hollings and Mr. J. H. Prinsep, for trial in the Punjab.

9. An assortment of maize, bean, melon, pumpkin, cucumber and other seeds, including the "Tootooi" and "Kau nuts," all from the Sandwich Islands. *Presented by Mr. R. J. Hollingworth.*

The following is extract of Mr. Hollingworth's letter respecting a few of these Seeds :—

"*Tootooi Nuts.*—These nuts are used by the natives as candles. The kernel is of a very oily nature,—and the oil expressed from it is an article of commerce at Honolulu. The tree is very beautiful and umbrageous, growing to the height of from 60 to 80 feet. These seeds take a long time to vegetate.

"*Kau Nuts.*—The trunk of this tree frequently exceeds three feet in diameter. The wood is much prized, being in color like mahogany, and taking a very fine polish. The native chiefs use the wood for their dishes.

"Bahama Grass Seeds (Manchama) a sweet scented ornamental and very nutritious Grass."

10. A few bunches of grapes, apparently the Muscatel variety, the produce of the Vines referred to in his communication, submitted at the General Meeting of December, 1853. *Presented by Mr. J. Thompson.*

11. Sample of an extract from an Euphorbiaceous plant, probably *E. ligularia. Presented by Dr. Riddell.*

"Dr. Riddell wishes to be informed what is thought of this substance, which he thinks, from its compactness, sweetness, and purity, in every way may be compared to the article of commerce so much in demand—Gutta Percha."

The Secretary intimated that he had transferred this specimen to Dr. O'Shaughnessy, who had forwarded it to Mr. Brunton, Deputy Superintendent Electric Telegraph, Madras, for official report.

12. A further and better prepared specimen of arrow-root powder, raised and manufactured at the Baraset Garden. *Presented by Baboo Peary Churn Sircar, Secretary Local Committee, Public Instruction Baraset.*

13. Two specimens of cotton raised at Deebroghur, Upper Assam, from foreign seed supplied by the Society, and two specimens of indigenous cotton. *Presented by Major S. F. Hannay.*

Major Hannay is desirous of an opinion on these musters, and for a further and larger supply of fresh American seed to reach Assam in July next, the best time for sowing.

The Secretary stated that in accordance with the Resolution passed at the last meeting, he had taken the necessary steps to meet Major Hannay's request for fresh seed early in the season. He had also referred the samples in question to Mr. James Cowell, who had favored him with the following report on them :—

"No. 1. Foreign seed grown at Deebroghur in Assam, 1853, is descended from Sea Island Stock, as the seeds show, Fibre long and fine, an excellent cotton. I observe by Littledale and Co.'s Price Current, that Sea Island Cotton was quoted last December, in the Liverpool market at 22*d* to 24*d* per lb., for 'fine to good fine' (under which denomination I should class this fibre) and 28*d* to 36*d* per lb. for 'good to fine' qualities. If Major Hannay could send us down a few bales of this cotton for shipment home we should better arrive at its true value than by the inspection of a small sample. I should imagine that the prices quoted would be amply remunerative and induce cultivation on a large scale.

"No. 2. Foreign seed grown at Deebroghur, appears to be from the New Orleans variety. Short staple, and wool adhering tenaciously to the seed. A good cotton, worth in Liverpool probably from $5\frac{7}{8}d$ to 6*d* per lb. if well cleaned. Fibre strong and pretty fine in length and complexion.

"Nos. 1 and 2. Native Jaloha and Derakuppas are very similar in quality : fibre rough, strong and short, as usual."

The following were also placed on the table, the produce of the Society's garden :—

A specimen of cotton raised from the "Maltese brown cotton seed." *Presented by Mr. Piddington in May*, 1852.

This specimen, (like that raised by Mr. Piddington from the same supply of seed, and presented in November, 1852,) proves to be a *white* cotton, of fair length and strength of staple, and separating more easily from the seed than the Maltese brown variety.

Two ears of Maize, raised from American seed of the sort termed "Cooper's Prolific Corn."

These ears are fully equal in every respect to the original stock, though grown out of season.

A small quantity of Demerara Indigo seed raised from seed. *Presented by Mr. Piddington, in September*, 1852.

A fine healthy plant of the Cape heath *(Erea speciosa) in flower*, raised from seed. *Presented by Mr. Emerson, in October*, 1852.

Horti-Floricultural Exhibitions.

Read the following reports of the Judges at the show of vegetables, fruits and flowers, held in the Auckland Circus, on the 20th of January.

"In submitting the annexed list of prizes awarded at the first Horticultural Exhibition of 1854, the Judges beg to add a few remarks :—

"*First, in regard to Foreign Vegetables.* The collection was, on the whole, a very satisfactory one. The cauliflowers, which occupied a prominent place, were well represented ; the heads being large, solid and well formed. The green curled and corn kale were more abundant and better grown than those exhibited last year. Of Brocoli, two kinds were submitted, the 'sulphur' and 'large white ;' the former was neither plentiful nor good : the latter was more abundant and well grown for so early in the season. Cabbages of five kinds were brought forward, namely, the 'Dwarf York,' 'Battersea,' 'Savoy,' 'Drumhead,' and 'Red.'—All these were fully as well grown as last year when the display was considered so good. The red and white Nole-kole were plentiful, and of a nice medium size. The green curled and broad leaved Endive were well grown, fairly blanched, and in abundance. Only four baskets of Spinnage were shown ; but they were well grown, fresh, and of a good green color. The Cabbage and Coss Lettuce were as usual in abundance and fairly grown. Six (6) sorts of Turnips were submitted for competition, the white flat, Dutch stone, yellow stone, large white globe, red top and Swedish : the two first were of good quality, well shaped and abundant ; the Swedish was more plentiful and better grown than last year ; the red top was scarce, but the specimens were well formed. Of Carrots there were four kinds, all well represented, especially the altringham and short horn : the long, red and yellow are more adapted for feeding cattle. The Potatoes, of which there were four kinds, were equally as well, if not better, represented than last year ; there has not, probably, been so fine a display on any previous occasion. Beans of four sorts were submitted, the Dwarf French, White Runner, long pod, and scarlet runner : the two former were plentiful, tender and well grown ; the two latter were scarce, but shewing an improvement on previous specimens. Of Peas there were four distinct sorts tender and well flavored, more especially the Imperial blue and marrow-fats. It being a difficult matter to distinguish several of the kinds of peas after being picked, we would recommend that each exhibitor be instructed to place the correct name of the peas in each basket ; and with the view of inducing the gardeners to adopt this recommendation, not only as respects peas, but other sorts of vegetables, additional prizes might be given for the best and most correctly named specimens. Only two bunches of Asparagus were shown, both well grown for the time of year. The red and white celery shewed an improvement, more especially the red kind raised from seed, which seedlings are so superior always to the offsets of a previous year

which, indeed, are only fit for soups, &c. Water-cress was in abundance, as also pot-herbs, such as thyme, savory, sage, parsley and mint. The turnip-rooted and long red beet were in abundance and of good quality. The Judges beg to add the following note from the Society's gardener respecting this vegetable :—

"The native gardeners do not seem to be aware, that to keep the dark red colour in the root is the main feature and best quality of beet. This can only be effected by careful lifting in such a manner that not the smallest fibre be broken or bruised, as that is what gives the root a pale color from bleeding at the wounds caused by careless lifting. Neither should it be washed after lifting, nor before the root is half boiled at a low fire ; when the outside skin will peel off, and leave the heart clean and of a good bright color. The leaves should also be cut off at least two inches above the main crown, to prevent bleeding as much as possible."

Of Native Vegetables, there was a fair display of beans of sorts, yams of several kinds, gourds, tomatos, saugs and maize.

In the Fruit Department, pomegranates, sapotas, oranges, pine-apples, rose-apples, guava, pumplenose, plums, bel, plantains, &c., were shewn, to several of which prizes were adjudged.

The Judges have to remark, in conclusion, that the show was, on the whole, very creditable to the *mallees*, of whom upwards of 200 were in attendance, to 67 of which prizes, amounting in the aggregate to Rs. 299, were awarded by the Rajah Pertab Chunder Sing, a Vice-President of the Society.

(Signed) W. G. Rose.
„ Peary Chand Mittra.
„ St. Douglas.

Floricultural.—"The Judges have to report that the competition at this first show of the season was limited, not exceeding that of last year, which was considered as inferior to the exhibition of 1852. The produce of thirty gardens only was submitted, to seventeen of which prizes, amounting to Rs. 75, were awarded, as per details noted on the annexed sheet.

The plants, perhaps, most worthy of notice, were the Camellias, red and white, of which a dozen were brought forward. The collection of Roses were better than at any previous show. The *Pelargoniums* were not in flower, but a prize was awarded to the best collection of fifteen sorts, as it included several exceedingly well grown plants. Some fair samples of Euphorbia Jacquinflora were exhibited, as also a well-grown plant of Troopeolum tricolor, and a cut specimen of Habrothamnus fasciculatus, the two latter being novelties at these shows.

The Judges have again the pleasure of bringing to the notice of the Society the kind and material assistance so obligingly rendered by Major Burn,

Town Major; Major Bazely, Deputy Principal Commissary of Ordnance, and by Major Abercrombie, Officiating Garrison Engineer, in the loan of tents and stands, and for the use of the ground in the Auckland Circus on which the show was held.

The number of visitors was as great if not greater than at any previous show; it is calculated that between two and three thousand persons were present. No band was available.

(Signed) H. Falconer.
„ Benj. Warwick.
„ R. M. Thomas.

In connection with the above, it was moved by Mr. Warwick—"that there be a fourth flower show, to be held in the Town-Hall early in April, say on the 7th, being a public holiday." Referred to the Council.

The Gardener's Monthly statement was read. Mr. McMurray reports that all the peach trees are making a healthy growth, and have set a heavy crop of fruit, which will aid in testing the experiment of under-drainage recently adopted. The mango and lychee trees are backward, and are not likely to yield much fruit this season, arising from an after growth which took place in October last. The American Sumach trees are now producing a large crop of seed, which will be ready for distribution in April next. The American maize of last season's importation is also ripening a fine crop of corn, which will be available to members in time for planting during the next rainy season. The pea crop is more vigorous, and bearing a heavier crop this year than any previous one, arising from the top dressing the ground received last year. Mr. McMurray adds,—"the accompanying plant of Cape Heath *(Erica Speciosa)* in flower is the produce of one kind of the seed presented to the Society by A. Emerson, Esq., on the 20th October, 1852, from which it will be seen that the plant has made a good growth since that time, and is probably the first plant of the sort which has flowered in Bengal. In addition to this variety of Heath there are in the Garden ten other kinds raised from the same batch of seed—equally as healthy, but not so large. In conclusion, I have to remark that the large plant of *Victoria Regia* is going on satisfactorily, but that eight of the smaller *Victorias* have been killed by the cold weather."

A statement from the Gardener, shewing the result of the sowings of the German and French flower seeds received in September last, was also submitted; from which it appears that of eighty-one sorts of German seeds put in the ground, thirty-one have only germinated, and these, with few exceptions, very partially. Of 263 kinds of French seed only 103 have germinated, some freely and some indifferently.

Defaulter to the Society.

The Council having brought to the notice of the Meeting that Mr. R. C. Bell had failed to pay the amount (Rs. 164) due by him for fruit grafts supplied in December, 1851 and January, 1852, it was resolved that, in accordance with the provision of Section 7 of Chapter III. of the Bye-Laws, his name be published as a defaulter.

Amendment by Mr. W. G. Rose. "That as Section 7 of Chapter III. was altered after the claim upon Mr. Bell arose, the rule, in its altered state cannot have retrospective effect, and does not, therefore, apply to the Society's claim upon Mr. Bell." Put to the vote and lost.

Communications on Various Subjects.

The following letters were likewise submitted :—

1. From A. J. Brown, Esq., dated Mirzapore, 24th January, submitting some remarks on the subject of coffee planting in Southern India, and the advantages it offers in comparison with Ceylon. Referred to the Committee of papers.

2. From Captain G. H. Hollings, dated Shahpore, Punjab, 15th January, further facts on the useful properties of the Mŭddār plant, *(Calatropis Hamiltonii.)*

"Since I last wrote to you I sent some moulds made of Mŭddār Gutta Percha to Mr. Berresford, the Secretary of the Delhi Bank, in order that he might try some experiments to ascertain if they could be used with advantage in Electrotyping. He sent me back as the result of his experiment a fac-simile in copper of the impression of a silver coin, and mentioned that the mould was not in the slightest degree injured. He writes that the Mŭddār possesses the following advantages :—

"'It appears to produce most faithful copies of the coins without much pressure, which would be of much importance if copying a plaister of Paris or other medallion of like brittle nature.

"'The connecting wire of the battery is most readily attached to the impression. It requires no varnish on the back and sides to prevent injury to the mould, the sulphate of copper, so far as I can judge, not having affected it in the slightest degree.

"'The face or impression receives a coating of plumbago, and rubbing with cotton, till a good polish is obtained without the least injury to the detail of the impression.'

"The only objection that occurred to Mr. Berresford was that the moulds sent to him were too plastic, which caused a difficulty in removing the deposit of metal without injuring it. This was caused from my having sent new moulds. After they have been kept for two or three months, they become much harder, which removes the difficulty effectually.

"I had lately an opportunity of passing through a part of my district in which gunpowder is manufactured, and learnt that the wood of Mŭddār is

considered the most valuable for converting into the charcoal used in the composition of that powerful agent of destruction, and in the course of some experiments I have lately been attempting to produce good gas for purposes of illumination from the coal found at Kalabagh and in different parts of the Salt range. I had opportunities of seeing that the gas produced by combustion from the wood of Mŭddār, after the fibre has been removed, possesses great illuminating power.

"It may be as well to state the result of all attempts that have been made to utilize the Mŭddār, and the products obtained therefrom.

"Before any attempts had been made by Europeans to ascertain its properties, the natives had extracted medicines from the roots and used the milk as a poison; in the Punjab, it was applied to the nurse's breast, and found an efficient means of ensuring the death of female children—the smallest portion imbibed with the milk being sufficient for the purpose—the large roots were hollowed out to form the lower portion of the musical instrument called a sitar, including the sounding board. In some parts of the country twine was made from the fibre. The leaves are soaked in water, and used for tanning in many parts of the Punjab. The wood converted into charcoal was used in the manufacture of gunpowder. The Journal of the Agricultural and Horticultural Society records the manufacture of fine cloth from the cotton formed round the seed. 2. The preparation of thread, twine, rope, and coarse cloth, from the fibre—in a series of experiments made with the object of ascertaining how far the product could be used as a substitute for hemp or flax. 3. The preparation of a substance from the milk as an equivalent for Gutta Percha. The qualities of the wood, and their value of producing illuminating gas remain to be ascertained. With so many valuable properties, it will be strange if we do not soon learn to utilize the Mŭddār, which has hitherto been thought so little of."

3. From Dr. O'Shaughnessy, Superintendent Electric Telegraph, reporting on the Mŭddār extract received from Captain Hollings as a proposed substitute for Gutta Percha. "A single experiment," observes Dr. O'Shaughnessy, "suffices to prove its total inapplicability to telegraphic purposes. In the thickness used for coating wires it remains soft and adhesive like glaziers putty at the temperature of 61° Fahrenheit. I have forwarded the parcel to Mr. Brunton, at Madras, for further examination and report."

4. From Dr. Falconer, forwarding the following extract of a letter to his address from Major J. Clarke, Deputy-Commissioner, Goozranwalla, Punjab, dated 2nd January :—

"I write now to ask your assistance to get me some Cotton seed for distribution among the zemindars of my district. The kind I should like to have is what I believe is called *Pettigulf* or *gulph*. I find this description thrives very well here. I consider that it is likely with any thing like encouragement with seed, to be *very largely* introduced in supercession

of or addition to the ordinary kind. I have tried it two years, and have many applications for seed, but my stock is small. What I grew this year was grown in a field. I treated it exactly like common country cotton plant. The produce is very superior, and the plant seems to have stood the drought quite as well as the country kind; the crop is also *much* heavier than the country kind gave. Our soil is usually a light sandy loam, till we touch the Chenab or the Ravee, the flats of both of which I imagine might grow Sea Island Cotton, but cultivation on those flats is precarious.

"If you can send me any Cotton seed of the Pettigulph kind, it ought to be sent off at once, as our Cotton sowing begins the end of February, lasting all through March.

"I presume that the seed might be sent on the public service.

"I imported some Egyptian seed last year; the Cotton plants looked very fine and grew to a large size, but the produce is all poor, color bad, and pods small; it failed, I may say, perhaps from want of proper treatment."

The Secretary intimated that he had transferred to Dr. Falconer all the Cotton seed in store of last year's importation of the kind applied for by Major Clarke.

5. From J. W. Payter, Esq., of Bogra, dated 19th December, respecting the flowering of the Sugar Cane :—

"I was somewhat amused to observe the allusion made at a late meeting of the Society, to the fact of the rarity of Sugar-cane appearing in blossom. Twelve years ago, I had whole fields in blossom; this was from the cane I got from the Society; being unable to break through the prejudices of the ryots that year to cultivate it, the crop remained mostly uncut and *all* ran into tufts; but I regret to say I took no steps to ascertain whether it contained anything like seed or not. I have seen country cane in blossom, but very rarely, and only one or two here and there. The Rattans produce tufts more generally than the first crop."

6. From S. Mornay, Esq., enclosing a list of Brazilian plants, which he thinks would prove desirable introductions into India.

7. From Messrs. Bates, Hyde and Co., of Bridge-rates, Massachusetts, acknowledging receipt of a remittance of £250, being the amount awarded by the Government of India for their Saw-gin.

8. From Messrs. Hamilton, Higginson and Co., of Mirzapore, acknowledging receipt of the Special Committee's Report on the Cotton-cleaning Machines submitted for competition, and offering some remarks thereon with reference to their previous communication.

9. From Messrs. Grindlay and Co., London, acknowledging receipt of specimen of Munjeet Garancine and of Mŭddăr extract and fibre, which they have transferred, as directed, to the Society of Arts.

10. From the Rev. F. Schurr, tendering his acknowledgments for seeds supplied for the use of the Christian Settlement at Kapasdanga, in the Kishnaghur District.

11. From W. Blundell, Esq., acknowledging receipt of notice of his election as a Member of the Council ; and intimating his readiness to co-operate to the best of his ability in advancing the interests of the Society.

12. From W. G. Young, Esq., Under-Secretary Government of Bengal, intimating, in reply to the Society's application, that a free passage will be given by steamer from Allahabad to Calcutta for the six cases of fruit grafts from the Botanic Garden at Saharunpore.

13. From S. H. Robinson, Esq., acknowledging receipt of his election to the office of Acting-Secretary, and recommending Mr. Flouest as his Assistant. The Council having intimated their approval of this nomination, it was resolved that Mr. Flouest be confirmed in the office.

14. From R. Clarke, Esq., Honorary-Secretary Royal Asiatic Society, returning thanks for a copy of Part 2 of Vol. VIII. of the Journal, and applying for certain previously published Nos. to complete the set in their library. Resolved, that this request be complied with.

It was agreed, on the recommendation of the Council, that a further sum of £22 be remitted to Messrs. Grindlay and Co., to meet the cost of the new die, gold and bronze medal, &c., alluded to in the last month's proceedings.

(Saturday, the 11th March, 1854.*)*

The Hon'ble Sir Lawrence Peel, President in the chair.

The proceedings of the last General Meeting were read and confirmed, and the following gentlemen, who were proposed on that occasion were duly elected members. Major Jones Stevens, Captain W. H. Lomer, Messrs. Charles Horne, Geo. P. Shearwood, R. J. Carbery, R. G. Lord, and Arch. James Brown.

The names of the following gentlemen were submitted as desirous of joining the Society :

Mr. J. Finch, Indigo Planter, Bubnowlee Factory, Goruckpore,—proposed by Mr. W. Earle, seconded by Mr. J. Willis.

D. Simson, Esq., C. S., Leia, Punjab,—proposed by Mr. M. Wylie, seconded by Mr. C. R. Prinsep.

Mr. Thomas John Watson, Merchant, Calcutta,—proposed by Mr. G. Ackland, seconded by Mr. W. G. Rose.

Mr. Wm. Stewart, Indigo Planter, Deahree Factory, *viâ* Shergotty,—proposed by Mr. R. Blechynden, seconded by Mr. W. G. Rose.

Mr. Henry Deverell, Indigo Planter, Ackerygunge Factory, Berhampore,—proposed by Mr. Robert Watson, seconded by Mr. C. A. Cantor.

Presentations.

The following contributions were announced :—

1. Journal of the Asiatic Society of Bengal, No. 7, 1853. *Presented by the Society.*

2. A few Potatoes raised at Akyab. *Presented by Captain J. W Cannon.*

These were not otherwise remarkable beyond being, Captain Cannon believes, the first of the size grown in Arracan.

3. A collection of Chinese seeds and specimens for the Society's Museum from Mr. R. Fortune.

The following is the substance of Mr. Fortune's letter accompanying the above, dated Shanghae, December 30th, 1853 :—

"In accordance with instructions received from the Government of Bengal, I have the pleasure to send you a large collection of seeds, &c., which I have collected for the Society during this autumn and winter in the Central and Eastern Provinces of China. The box containing these seeds has been shipped in one of the Peninsular and Oriental Company's steamers, which leaves this port to-day, and I have the honour to enclose a Bill of Lading, by which you will observe the freight is made payable in Calcutta.

"All the seed papers are marked with names and numbers, and I also enclose a detailed list of the whole in this letter. You will observe, I have included five varieties of rice grown in China, and I have given you the names by which they are known, in order that larger supplies may be procured, should you consider all or any of them of sufficient value. I also send two kinds of Millet which are extensively grown in the Tea districts, and often between the rows of the bushes, in order to afford a slight shade during the hottest weather in summer. Specimens of these in ear are also sent for the Society's Museum.

"When in the Province of Chekiang last autumn, I procured a specimen of the Hemp Palm (Chamærops—sp.) and I now send you a portion of its stem, shewing the large quantity of fibre it forms under the leaves. This fibre is of great value to the natives who use it for a variety of purposes, such as ropes, cables, twine, brushes, hats, cloaks, &c. The detached sheets I send in the Box will shew how it is cut from the tree. I trust these articles will be acceptable additions to the Museum of the Society.

"Nos. 13, 14, and 15 are seeds of plants cultivated in China for their fibre, and which, if not already in India are not worth introduction. One of them —the Luk Ma—seems identical with the Indian 'Jute,' which is now becoming an article of considerable importance. No. 9 contains seed of the 'Tong-eau,' from which a valuable wood oil is expressed, much used by carpenters. No. 10 contains seeds of a kind of Hawthorn, from which excellent jellies and other preserves are made. Nos. 20, 21 and 22 are used as soap by

the natives, and the latter is that described by Dr. Falconer in the 7th Volume of the Society's Journal.

"In addition to these various productions I must draw attention more particularly to Nos. 18 and 19. These papers contain ripe seeds of the *Green Indigo* (so called) which is so much thought of by the French chymists, and to which my attention was directed by Dr. Falconer, and Mr. Henley through the Government of India and the Society. I have also succeeded in procuring plants of the cultivated kind, which I shall take an early opportunity of forwarding to the Society. I need not remark upon the importance of taking great care of these seeds, but I may suggest the propriety of sending a portion of them to a cooler climate than that of Bengal, say the N. W. Provinces or Assam, where they will probably succeed quite as well as they do in China. As I gain more information concerning this important dye, I shall not fail to communicate it to the Society.

"I have only to add further, that the box contains a good supply of the seeds of various ornamental trees, such as Cryptomeria Japonica and the Funeral Cypress, which I hope will one day produce useful timber, and give another feature of beauty to the Indian landscape."

The Acting-Secretary stated that a portion of these seeds had been forwarded on arrival to the Society's Nursery Garden. It was agreed that the remainder, the whole quantity being limited, should be distributed to a few of the most active members of the Society in different parts of the country, who would give them a fair trial and report the result to the Society, and that it be referred to the Nursery Garden Committee to prepare a list of such Members accordingly.

4. A second sample of Tapioca grown and manufactured at Beerbhoom by Messrs. Sumboo Chunder Ghose and Co. *Presented by Baboo Preonauth Sett.*

This sample was admired by several members present for its superior quality.

5. Eleven and a half seers of Ceylon Coffee seed. *Presented by G. W. Thwaites, Esq., Superintendent Royal Botanical Garden, Ceylon.*

Half of this was sent for trial to the Society's Nursery Garden, the remainder is available for distribution to members.

6. Thirty-six and a half seers of Tapioca, from the Society's Nursery Garden.

7. Four cases of Chinese plants and seeds from Mr. R. Fortune.

The following is Mr. Fortune's letter referring to the above, dated at Hong Kong, 14th February, 1854 :—

I have the pleasure to inclose a Bill of Lading and list for four cases of plants and seeds collected by me for the Agricultural and Horticultural Society of India. These cases were shipped at Shanghae on the 19th of Jany., and I have now seen them re-shipped at Hong-Kong for Calcutta. They

contain a number of plants, which I believe to be of great value and interest, and I hope they will reach you in good order.

The detailed list which I enclose will give you nearly all the information which is requisite, but I cannot help drawing particular attention to the *Green Indigo* plant (so called)—the 'Lo-yah' or 'So-lo' of the Chinese—which I have discovered this year in the Province of Chekiang. In my last dispatch, I sent you some seeds of this valuable species, and I have now the pleasure to send six healthy young plants in cases Nos. 3 and 4. These cases contain also a number of cuttings of another plant, which is extensively cultivated in the same Province on account of a blue dye which it furnishes, and which is, in fact, the Indigo of that part of China. I have sent a detailed account of the cultivation and manufacture of this important dye to Professor Lindley for publication in the *Gardeners' Chronicle and Agricultural Gazette*, and must refer you to that Journal for further particulars.

With regard to the fruit trees in these cases I may draw attention to the 'Yang mae' (Myrica—sp:) which I think will be valuable in India; to the 'Kum-quat' (Citrus Japonica) well known from the excellent preserve of that name, which is made from it; to the Shanghae and Flat Peaches, two kinds of great excellence, and to some seeds of the Chinese Chesnut, which I have sown in the soil of case No. 3., and which will probably vegetate on the voyage to Calcutta.

Amongst other things of interest on account of their useful properties, I may notice the Varnish tree, the Wax Insect tree, the Hemp Palm, the Soap Bean tree, and the Salisburia, which forms one of the largest timber trees in the Central and Eastern Provinces of China.

The other plants in the cases are of an ornamental kind. Most of them have been introduced into Europe within the last ten years, and will be found described and figured in the various Botanical and Horticultural periodicals.

In conclusion, I have the honor to acknowledge the receipt of your letter, dated November 18th, enclosing a translation of a memoir by M. Persoz and a list of plants you are desirous of receiving from China. I have also to acknowledge the safe receipt of your Bill on the Oriental Bank, for Sa. Rs. 200, and shall endeavour to spend that sum in a way that will tend to promote the interests and honor of your Society.

These cases were forwarded on arrival to the Society's Nursery Garden, and the Gardener's report thereon is, that out of 431 plants, including seeds germinated on the voyage, 342 have arrived in good health, fifty-two sickly, and thirty-seven dead.

Horticultural Exhibitions.

Read the following reports of the Judges at the show of Vegetables, Fruits, and Flowers held in the Auckland Circus, on the 14th February.

In submitting the annexed list of prizes awarded at the second Horticultural Exhibition of 1854, the Judges remark:—

The Judges beg to offer the following remarks regarding the specimens submitted at the second exhibition of vegetables and fruits held in the Auckland Garden, on the 25th of February, 1854.

First, in regard to Foreign Vegetables.—The cauliflowers, purple and white brocoli, were not perhaps so abundant ; nor yet so good as might have been expected at this season. Seven kinds of cabbages were placed on the table, sugar-loaf, savoy, battersea, red, drumhead, dwarf and large york, all of excellent quality. Of green curled and cow kale, there were a few baskets only, but of good quality. The broad leaved and curled endives were in abundance, and well blanched. Of lettuces there were four sorts, brown, Dutch, Paris coss, cabbage and black seeded. The celery is improving, several well-grown specimens were shown, tolerably solid, and well blanched. The purple and white nole-kole were plentiful and of fair quality for the lateness of the season. The American white flat, yellow stone, white globe, yellow globe, and Swedish turnips were plentiful and good. Of carrots, six well grown kinds were brought forward, viz. altringnam, long red, short horn, large white, purple colored, yellow, and a large straw colored, and apparently new variety. The turnip rooted and long red beet were shown in abundance and of fine quality. The early white, long, red and deep *set eyed* potatoes were in abundance, and perhaps equal in quality to any previous exhibition. The Windsor and long pod beans were of good quality and the latter in abundance. Several baskets of peas were placed on the stands, of which the imperial blue and marrow took the lead. The specimens of squash were poor in quantity and quality. A few fair bundles of asparagus for the time of year were submitted, tender, and having the proper purple bloom at the point of the shoots. Several baskets of globe artichokes were shown well grown and in excellent condition. Of other vegetables it may be observed, that the onions and leeks were in abundance, and of good quality, the large tomatos, yellow and red capsicum exceedingly good ; the collection of pot-berbs equal, perhaps, to any previously shown : water and curled cresses plentiful and good. Horse-radish scarce and poor.

Fruits.—In this department there was a tolerably fair display of pomegranates, sapotas, oranges, pine-apples, guavas, papeeas, long and round plums, *(zizyphus)* bale, limes, loquats, strawberries, plantains, &c.

Of Indigenous Vegetables.—There was a large assortment, especially of yams and saugs of sorts.

The competition was very spirited. Upwards of 200 gardeners were in attendance. Prizes amounting to Rs. 262 were awarded to fifty-two, by the Rajah Pertab Chunder Sing, Vice-President, in the order shown in the annexed detailed list.

(Signed) G. W. Rose,
„ Peary Chand Mittra,
„ Wm. Haworth.

Horticultural.—The Judges have to report that this show was not better than the second exhibition of last year, and by no means equal to that of 1852. Among the few novelties were two or three well grown plants of Velthamia, a few of Rogerracordata, one of an Azalea, and another of Kennedya. Some exceedingly fine plants of Pelargoniums were shown, a good collection of oxalis, and a few fair Camellias. Of the more common order of Annuals, which were well represented, Schizanthus, Clarkias and Portulacas took the lead.

The amount set apart for prizes was Rs. 289, but Rs. 111 only were awarded, as per detailed list annexed.

(Signed) H. Falconer. M. D.,
„ R. M. Thomas,
„ W. H. Elliot,
„ A. Grote.

The Gardener's monthly statement was then read.

Mr. McMurray reports as follows :—In continuation of my report for January last, I have now to state that my anticipations regarding the mangoe and lychee trees showing but few bloom buds this season, were quite correct, and more especially observable in the case of the Mangoe trees, which have made a healthy growth. Four plants of the two lines of Avocado Pear trees grown on each side of the cross walk leading into the orchard ground, are now producing flowers for the first time. The Vanilla Aromatica, and Grandiflora plants running up the large Almond tree, are also showing a fair number of flower spikes, from which it may be hoped that a good crop of pods will be produced. One of the five seeds of *Nelumbium luteum* received on the 4th, and sown on the 5th October last from the Botanical Garden, France, germinated on the 2nd instant—the seedling is now doing well.

Mr. French's presentation of twelve seeds of the *Cœsalpinia Coriarium* or *Shumach* were received on the 28th, and sown on the 29th January last, and have germinated freely.

Mr. W. Earle's contribution of a small phial, containing roots of the double flowering convolvulus were found rotten on opening the bottle on the 6th February last.

Mr. W. G. Frith's presentation of fifty Arum Bulbs were received on the 13th February in good order.

Mr. R. J. Hollingwood's contribution of thirty-two kinds of seeds, without name, including maize, beans, cucurbitaceous and other kinds of seed from the Sandwich Islands, were received on the 14th, and sown on the 18th February, and have nearly all germinated.

Mr. C. B. Stewart's presentation of ten Australian plants were received on the 4th instant in general good condition.

The twenty-four kinds of seeds received from Mr. Fortune, China, have been sown, and the accompanying statement will show the number and condition of the plants contained in the four glazed cases received on the 6th instant, also from Mr. Fortune.

In conclusion, I may here add that the Victoria Regia plant has produced two fully expanded flowers since the date of my last report, and that the size of the leaves and healthy green colours of the foliage are increasing daily with the warm weather.

Mr. B. Warwick's proposal, brought forward at the last Meeting for a fourth Flower Show, to be held in the Town Hall on the 7th April, was then submitted to the Meeting and carried.

Report from the Nursery Garden Committee.

The following Report was then read :—

Proceedings of a Meeting of the Garden Committee, held at the Garden on Wednesday, the 23rd of February, 1854.

Present.—Messrs. W. G. Rose, Stewart Douglas, and A. H. Blechynden, Secretary.

The Committee having inspected the Garden generally, agreed to recommend that the following works be undertaken before the next rainy season, the same being deemed very desirable :—

1*st.* That the piece of ground measuring about 325 feet by 150 feet on the west side of the peach plot be under-drained, similarly to the peach plot, which was under-drained in the early part of 1853, and has been found to answer the purpose so admirably of carrying off the surface water during the rainy season. The Gardener states, that if this work were commenced in March, it could be completed at leisure by the establishment before the setting in of the rains. This piece of ground has already some valuable grafts on it, and it could be appropriated for planting out the peach grafts expected from Saharunpore and Champarun ; and for other good peach grafts, raised from China stock, at present in pots. The few mango grafts, now on the ground, can be removed to another part of the garden.

2*nd.* That the walk between the old and new cutcha conservatories be widened about three or four feet ; this will give the walk a more sightly appearance, and admit of pot plants being placed on each side.

3*rd.* That the barrel built drain leading out of the tank at the north end of the pea ground be increased by twenty-four feet, to admit of a free passage of water to the westward, which during the rainy season lies on the ground to the injury of the crops in the vicinity.

4*th.* That another barrel drain of twenty-seven feet in length be built through the ditch at the western boundary of the Garden. This will not only be useful for carrying off the water in that direction, but will prevent

the people making a path through that portion of the ditch which has been broken down by the rains.

5th. That a good bottom foundation be given to the new vine border contiguous to the out-offices of the Gardener's house.

The following is copy of an estimate furnished by the Gardener of the cost of carrying out the above improvements :—

30,000 bricks for making 15 drains in the plot of ground at Rs. 5 ₱ 1,000, ... Rs.	150	0
2,000 bricks for bottoming the vine border and widening the walk at 5 Rupees ₱ 1,000, ...	10	0
1,000 bricks for building the two barrel drains, ...	5	0
3 mds. of lime for the same at 8 annas ₱ md., ...	1	8
8 mds. of Soorky at 3 annas ₱ md, ...	1	8
Labour of masons, ...	5	0
Total Co.'s Rs.,.....	173	0

The Committee are of opinion that the quantity of bricks required for the two barrel drains, will exceed the number mentioned in the above estimate, and would therefore recommend that a sum, not exceeding two hundred rupees, be granted for the above work. The Committee have further to suggest that the Secretary be requested, while in England, to procure the following articles for the Garden :—250 bell glasses of sizes for striking cuttings. These are much required, the present stock amounting to twelve only, and there is a difficulty in obtaining such glasses in Calcutta, at any cost. 2,000 cast iron tallies, for numbering and naming plants ; and as much galvanised wire as will enclose at least two acres of the Garden, on which to raise such crops as are now invariably destroyed by hares and jackals.

The Committee are unable to say what the cost of the above articles will be ; but they would recommend that, for the present, a remittance of, say £30, at 6 months' sight, be made on account to the Society's London Agents Messrs. Grindlay and Co.

(Signed) Wm. G. Rose.
„ S. Douglas.

Resolved that the outlay recommended by the Committee be granted, with the exception of the proposed remittance to Messrs. Grindlay and Co., respecting which, that it be referred to the next meeting for further consideration, and that in the interim further enquiry be made as to the probable cost of the proposed galvanized wire fencing.

Communications on various subjects.

The following letters were then read :

1. From Baboo Nobo Gopal Mullick, Bhowaniepore, acknowledging receipt

of ten copies of the *Indian Agricultural Miscellany*, and reporting their distribution amongst certain native gentlemen in his neighbourhood.

2. From Dr. W. Jameson, Saharunpore, dated 15th February, acknowledging receipt of Bank Bills for Rs. 150, towards payment of peach and nectarine grafts for the Society.

3. From the same, dated 21st February, advising dispatch of eight cases containing 269 peach trees, and eighteen nectarine grafts *viâ* Meerut and Allahabad to Calcutta, for the Society.

4. From C P. Carmichael, Esq., Officiating Assistant Secretary to Government, N. W. P., stating that the necessary orders had been forwarded to the Post Master General, N. W. P., for the free transmission of the eight cases of grafts referred to in the last-named letter.

5. From A. H. Blechynden, Esq., Secretary of the House Committee of the Metcalfe Hall, submitting the following extract of proceedings of the Committee held on Wednesday, the 22nd February.

First.—Read a letter from Baboo Modoosoodun Roy, dated 13th February, offering to make certain petty repairs to the Metcalfe Hall premises, for one year certain, for Co.'s Rupees forty.

Resolved.—To recommend that the above offer be accepted, commencing from the 15th March, on the following conditions:

1st. That the roof of the building be kept water-tight and free from vegetation.

2nd. That all the wood work be kept free of white ants.

3rd. That all petty repairs, such as replastering, small breakages of plaster, &c., be attended to.

4th. That a monthly inspection of the building outside and inside be made by Baboo Modoosoodun Roy, and a report on the same furnished monthly to the Secretary for the information of the Committee.

Second.—The Secretary having reported that the durwan of the Western gate had left service to proceed to his country, it was agreed not to engage another man in his place, and that the Northern gate durwan be directed to attend in future to both gates.

Third.—The Secretary having reported his intention of proceeding to England in the early part of next month, it was resolved that Baboo Peary Chand Mittra be requested to act as Secretary during Mr. Blechynden's absence.

Resolved.—That Baboo Modoosoodun Roy's tender be accepted with reference to the half portion of expense for repairs to the Metcalfe Hall, payable by the Society.

6. From G. Cooper, Esq., Under-Secretary to the Government, forwarding extract from a letter from Mr. R. Fortune, dated 30th December, 1853, stating that in compliance with the wishes of Government he is making extensive collections for the Society.

7. From Col. F. Jenkins, dated Gowhatti, 25th February, promising to lose no time in forwarding some further supplies of Cotton expected from Major Hannay, but which had not yet reached him.

8. From Lieut. W. H. Lowther, Mecrut, a paper of suggestions for constructing a cheap and effective plant-house. Referred to the Committee of Papers.

9. From Messrs. Smith, Elder and Co., dated 3rd January, acknowledging receipt of a remittance of £100, on account of the Society.

10. From the same, dated 19th January, submitting their account of the past half year, which shews a balance of £14-9-2 in favor of the Society.

11. From Messrs. P. Lawson and Son, Edinburgh, acknowledging receipt of £88-16-10 from Messrs. Smith, Elder and Co., and suggesting some arrangements for despatching and purchasing seeds for the Society in larger parcels than hitherto. This suggestion was referred to the Garden Committee.

A petition from Sheraz, Bill Peon, was then submitted, applying for an increase of pay, in consideration of his long and faithful services to the Society for upwards of 20 years. It was accompanied by a recommendation from the Finance Committee that his pay be raised from the present rate of seven Sa. Rs. to Co.'s Rs. nine per mensem, viz. eight Rs. as the pay, and an extra rupee as personal allowance in consideration of his long services. Resolved that the recommendation of the Finance Committee be confirmed.

S. H. Robinson,
Acting-Secretary.

(Saturday, the 8th April, 1854.)

Baboo Gobinchunder Sen, Vice-President, in the chair.

The proceedings of the last General Meeting were read and confirmed, and the following gentlemen, who were proposed on that occasion, were duly elected members :—

Messrs. J. Finch; D. Simpson; T. J. Watson; W. Stewart; and H. Deverell.

The recommendation of the Council submitted to the General Meeting of the 11th February that "Mr. Wm. Storm be elected an Honorary Member in consideration of services rendered to the Society," was then brought forward for disposal, and confirmed.

The names of the following gentlemen were submitted as desirous of joining the Society :—

Dr. R. Lyell, Civil Assistant Surgeon, Ghazeepore,—proposed by Mr. R. B. Garrett, seconded by Mr. G. G. Mercer.

His Highness Ishore Persaud Nawam Singh Bahadoor, Rajah of Benares,—proposed by Lieutenant-Colonel J. T. Lane, seconded by Baboo Peary Chand Mittra.

H. Caspersz, Esq., H. C. Mint, Calcutta,—proposed by Mr. W. L. Harwood, seconded by Mr. W. G. Rose.

W. G. Campion, Esq.,—proposed by Baboo Gobinchunder Sen, seconded by Mr. W. G. Rose.

Presentations.

The following contributions were announced :—

1. Three packets of Malta Cotton seed. *Presented by H. Piddington, Esq.*

Referred to the Cotton Committee for instructions as to their distribution.

2. From C. Gubbins, Esq., C. S., Bijnore, two samples of cotton, one from common country seed, the other from two years' old Meerut plants.

Referred to the same Committee for report.

3. From Captain James, a copy of his pamphlet on "Gas in Calcutta."

4. From R. Nicholson, Esq., a small quantity of wheat taken from a field containing about five beegahs, all of which had been blighted by lightning, or some other cause.

5. A case of plants from Mr. R. Fortune.

The following is his letter accompanying the above, dated Hong Kong, March 14 :—

"On the 14th of February, I had the pleasure to send you a Bill of lading for four cases of plants and seeds collected by me for the Agri-Horticultural Society of India. To-day I beg to enclose you another bill of lading for a case shipped on the Steamer *Shanghai* advertised to sail on the 15th instant.

"The list which I inclose will give you information as to the contents of the case, which I hope will reach you in good condition. I beg to draw your attention, more particularly, to the *Rice Paper plant* (No. 3) which is a species of great interest.

"I had the honor to receive your letter dated February 18th, acknowledging the receipt of the box of seeds (No. 2), and I am glad to hear they reached you in good order. It will afford me much gratification if you will send me a report upon the state of each consignment, and any hints which you may consider necessary for my guidance shall have my best attention.

"In laying this communication before the Society, I beg you will assure the Council and Members of my earnest desire to assist them in conferring a great and lasting benefit on the people of India."

6. Some seeds of the Nuggussur or Nukussur trees. *Presented by Baboo Peary Chand Mittra.*

7. Eight cases containing Peach and Nectarine Grafts, from Dr. W. Jameson, Saharunpore.

8. From the Society's Garden, a large quantity of Bean and Pea seeds, of sorts, and three kinds of American acclimated Maize.

9. Journal of the Indian Archipelago. *Presented by the Government of Bengal.*

10. From J. G. Fischer, Esq., a quantity of seed of the Nerium tinctorium.

11. From the Asiatic Society, its Journal No. 1. for 1854.

Horti-Floricultural Exhibitions.

Read the following reports of the Judges on the show of vegetables, fruits and flowers, held in the Auckland Circus, on the 14th March, 1854.

In submitting the annexed list of prizes at the third Horticultural Exhibition of 1854, the Judges remark :—

" With respect to the vegetables, the asparagus and globe artichokes were abundant and well grown ; the latter were particularly large and fine compared with former shows.

Of cabbages there were six kinds brought forward, viz :—sugar loaf, early York, Battersea, Savoy, drumhead and red. The whole of these were abundant as usual, and of excellent quality, more especially the Savoy and sugar loaf kinds.

Two kinds of Scotch kale were represented in better condition than on any other previous occasion : the heads of these were large, green, and well curled.

The early white and sulphur broccoli were shown in abundance, and of fair quality.

Of nole kole the purple and white kinds were exhibited in numerous basket-fulls and in capital condition for table use.

Four kinds of beans were placed on the table, viz : Dwarf, French, Lima long pod, and Windsor. The two former kinds were plentiful, young and tender, and the two latter more abundant and the pods better filled than is usually the case.

The display of leeks of 1852-53 sowings was exhibited in good order, and the seedling onions, and other kinds raised from off-sets, were well represented.

Of lettuces four kinds were brought forward, viz: brown Dutch, Parish Cos, cabbage, and black seeded Cos ; the whole of these were plentiful, tender and well blanched, also the green-curled broad-leaved endive were plentiful, well blanched, large and tender.

The flat squash was shown but poorly on this occasion.

The Altringham, short horn, large red, white, black, and orange carrots were very abundant and well grown ; the two first named are the best for table use, and the latter more suitable for feeding cattle.

Of beet-root, the long red and turnip-rooted were shown in abundance and well grown, but the greater part had lost the colour from cuts and bruises. Mangel-Wurzel was also shewn of a very large size, and of capital quality.

Of potatoes four kinds were brought forward, one of which is new to the shows this season; it was a full-eyed kind, with smooth red skin, and an oval shape; this appears to be an early kind. The second was the common early smooth skin and full-eyed sort of the bazar, which only retains its good qualities while young. The third and fourth kinds were very abundant and well grown; these are distinguished from the two first named by their deep set eyes and rough skin, which peculiarities always denote the best keeping potatoes.

The white, flat, and yellow stone turnips were equally as fine as those brought forward at the February show, and the white globe and Swedish kinds were more abundant and just as good.

A small quantity of horse-radish was shown of pretty good quality.

The collections of six kinds of English pot-herbs were of a nice green colour, and well grown.

The curled parsley, turnip-rooted and long red radishes were abundant, and of excellent description.

Several baskets of marrowfat, sugar, and Prussian blue peas well represented this vegetable, considering the late period of the year.

The red and white seeding celery were more abundant on this occasion than is commonly the case, and showed an improvement in size and quality. Celery raised from off-sets was also shown of a large size, but hollow stocks.

The collection of Native vegetables, including beans, yams, maize and ginger, &c., &c., were shown in abundance, and of very good quality.

In the fruit department, sapotas, pineapples and guavas were shown in abundance and of excellent quality.

The bale, pomegranate, and loquat, were plentiful, and of large size.

Three kinds of limes, and three of China country oranges, were brought forward. The competition in pumplenose, papya, plantain, plum, rose-apple, jamrool and cocoanuts was very spirited.

A few pots of strawberry plants were placed on the tables, bearing ripe and well flavoured fruit.

Green mangoes and half ripe peaches were also brought forward of a large size for so early a period of the season.

A few splendid large and well flavoured apples from Mr. William Moran's garden in Tirhoot were placed on the table.

One small basket full of the aumlokee, or *emblica-officinalis*, was brought forward on this occasion. Altogether the Show may be considered good, and the competition spirited.

(Signed) Wm. G. Rose,
„ S. Douglas,
„ Peary Chand Mittra.

Floricultural.—In common with the two previous shows of the present season, the Judges have to report a falling off in this, the third flower show, as compared with the corresponding ones of 1852 and 1853. This general inferiority probably arises from some unfavorable peculiarity of the season, added to the very general failure of the last flower seeds distributed by the Society.

The sweet williams and amaryllids were well represented, but no other classes were deserving of especial notice *as collections.*

Some good *specimens* were, however, exhibited, more especially amongst larkspurs and stocks, and a few good orchids, amongst which two specimens of phalœnopsis amabilis, and vanda gigantia, from the Hon'ble Co.'s Botanic Garden, were much admired.

A good healthy specimen of cobœa scandens in flower, raised from seed was almost the only novelty exhibited. Of 260 Rs. set apart for prizes only 79 Rs. were distributed as per annexed statement.

(Signed) R. M. Thomas,
„ A. Grote,
„ Benjamin Warwick.

Reports.

The Gardener's monthly statement was then read. Mr. McMurray reports that the pea crop of 1853-54 has, in comparison with the former seasons, nearly doubled the percentage. This is owing to the trenching and top dressing the ground received; in every other respect the cultivation was as usual.

No degeneracy has taken place in the quality of seed, although the same kind of crop has been grown on the same plot of ground for five years.

Although the hail storm on the night of the 22nd March, damaged the young peach fruit considerably, an abundant crop still remains on the trees in capital condition. The mangoes also sustained great damage from the same shower. Of the twenty-four kinds of seeds received from Mr. Fortune, seventeen he states have germinated freely, and among them the *green-dye.* The plants sent by Mr. Fortune arrived in good health. The nectarine and peach grafts sent by Dr. Jameson were received in good condition, but as no labels were put on the cases, it is impossible to distinguish them yet. "In conclusion," Mr. McMurray states, "I have to report from Mr. A. Scott a presentation of nine cart loads of bone charcoal dust from his sugar mill at Sibpore, and I find it a useful manure for pot plants and top dressing the ground."

The report from the Nursery Garden Committee read at the last General Meeting was then brought forward, and the recommendation of the Council "that £30 be forwarded to Messrs. Grindlay and Co., to meet the expense of bell-glasses, &c.," was confirmed.

Notices of Motion.

Mr. G. C. Mercer, then brought forward the following proposals :—

1. That from the present time all Members old or new pay the quarterly sum of 6 Rs. or 24 Rs. annually.

2. That the sum for a life membership be reduced from 400 Rs. to 300 Rs.

3. That all Members of 25 years' standing, who have paid up their subscriptions, be free Members, and so become from their long standing life Members.

4. That all Members who are at present on the List, on their attaining the lengthened period of 20 years' standing, become free or life Members.

5. That in future the Finance Committee, or any other Meeting, when the subject of our Funds is concerned, be restricted from disbursing such large sums as 3 to 4,000 Rs. without the especial votes of the entire association of resident and Mofussil Members.

After some discussion this last proposition was withdrawn by Mr. Mercer, and it was resolved that the other four be submitted to the Council.

Communications on various subjects.

The following communications were then read :—

1. From Baboo Kissory Chand Mittra, Deputy-Magistrate Jehanabad, accompanying a list of persons to whom he had distributed Vol. VIII, Part 3, of the Indian Agricultural Miscellany.

2. From F. A. Glover, Esq., Mooteeharee, intimating that the peach grafts he promised the Society are now ready ; but suggesting they should not be forwarded to Calcutta until after the first fall of rain, or about the end of June.

Resolved.—That Mr. Glover's suggestion be acted upon.

3. From Hodgson Pratt, Esq., Under-Secretary Government of Bengal, annexing copy of the following Notification :—

"The Most Noble the Governor of Bengal has been pleased, in accordance with the recommendation of the Agricultural and Horticultural Society of India, to determine that the gratuitous distribution of plants and seeds from the Hon'ble Company's Botanic Gardens shall from and after the 1st of April 1857, cease, except in special cases, and on purely public grounds."

4. From C. Horne, Esq., Bareilly, intimating that he is organizing a public garden at that station, and requesting supplies of cereals and other seeds, also suggesting that a copy of the Society's Transactions should be presented to the garden.

Resolved.—That the Bareilly Gardens be presented with any numbers of the Society's Transactions of which there are numerous spare copies, also that

Mr. Horne should be supplied with a further quantity of such seeds as he may require, beyond his share as a subscriber, at a low cost.

5. From G. Couper, Esq., Under-Secretary to Government, forwarding extract of a further communication from Mr. Fortune, advising despatch of a case of Chinese plants for the Society.

(Saturday, the 20th May, 1854.)

The Honorable Sir Lawrence Peel, President, in the chair.

The proceedings of the last General Meeting were read and confirmed.

The following gentlemen who were proposed at the last General Meeting were elected Members :—

Dr. R. Lyell, H. H. Ishore Persaud Nirvam Sing Bahadoor, Rajah of Benares, and Messrs. H. Caspersz and W. G. Campion.

The names of the following gentlemen were submitted as desirous of joining the Society :—

Khajee Abdool Guffar, Dacca,—proposed by Mr. W. G. Rose, seconded by Baboo Peary Chand Mittra.

Dr. McLean, Assistant-Surgeon, Debrooghur,—proposed by the Rev. E. Higgs, seconded by Mr. W. G. Rose.

Lieut.-Col. R. Horsford, Commanding Artillery, Cawnpore,—proposed by Major R. Houghton, seconded by Mr. W. Earle.

H. Wright, Esq., C. S., Shapoor,—proposed by Captain G. E. Hollings, seconded by Mr. W. G. Rose.

Brigadier P. F. Storey, C. B.,—proposed by Mr. C. A. Cantor, seconded by Mr. W. G. Rose.

F. Schiller, Esq., Merchant,—proposed by Mr. C. A. Cantor, seconded by Mr. W. Earle.

Presentations.

The following contributions were announced :—

1. From S. F. Seymour, Esq., a plant of the *Sansiviera Zeylanica*, with some of its fibre.

2. From Dr. J., McClelland, Pegu, five samples of Pegu rice.

3. From W. Earle, Esq., three samples of Arracan paddy, respecting which Mr. Earle writes as follows :—

"They were both brought up, the 19th instant, from Rangoon by Mr. Ford of the *Berenice*, who kindly procured them for us, from Mr. R. Hannay of that place. Mr. Ford considers them the produce of Arracan, though possibly they may be from the Bassein district. But, be that as it may, No. 1. deep yellow color, is precisely like the very best Arracan I have seen at home, and is a beautiful sample of well grown paddy, being bold, clean, and *remarkably heavy*. No. 2. olive color, with short winglets, resembles the sample No. 5 of Dr. McClelland, (five musters,

Nos. 1 to 5, sent up by him to the Society recently from Pegu, without any particulars,) but speaking from recollection, I do not think it is so fine as this sample. The latter has also much longer winglets adhering to the grain.

"Further, the No. 2 is somewhat like the *Baro dhan* sown here on the borders of jheels, after rains, ripening in about three months, I believe; but the latter is of a darker color and lighter grain, and I should think, inferior to No. 2.

"The No. 1. seems a more valuable rice than No. 2, but both are worthy of trial here, and I hope that Baboo Peary Chand Mittra, will kindly undertake to sow the greater portion of the samples, and report the results to the Society."

4. From J. H. Prinsep, Esq., a sample of cotton from acclimated American seed.

5. From C. J. Simons, Esq., Assam, a case of orchids, moss, and Nepenthes plants, sixty-five in all.

6. From Captain G. E. Hollings, Goruckpore, samples of cotton and thread from acclimated American seed.

Captain Hollings, in his letter referring to these specimens, writes:—

"I have despatched to your address two seers of cotton, and one seer of thread from the American seed acclimated at Leia and grown here. The heat which at times was excessive did not affect the growth of the plants, and the produce was as great and as good as expected. The thread was made by the prisoners in the jail—the cotton was also separated from the seed by them in the *churkas* used in this part of the world. Other things being equal, there cannot be a doubt of the superiority of the produce from the American seed; there would doubtless be great improvement in that from indigenous seed, if the cultivation was more attended to."

7. From A. Grote, Esq., Officiating Secretary Board of Revenue, a box containing samples of various productions from Major Hannay's farm at Debrooghur.

8. From Lieut. F. W. Ripley, Akyab, seeds of millet, and a kind of long grass called by the Burmese *Gyet-Thee*, from the flour of which excellent bread is made by the natives of Arracan.

9. From the Government of Bengal, Selections from its Records, No. 14, two copies.

10. From A. Grote, Esq., Secretary Asiatic Society, a box of gums from Swan River, belonging to Mr. R. M. Stephenson, E. I. Railway Company, at whose request they are forwarded to this Society.

11. A number of peaches of the Lucknow, Sultany, Butler, Shanghae and Drop varieties, from the Society's Garden, were placed on the table. Also a few bunches of grapes from the vines in the compound of the Metcalfe Hall.

Floricultural Exhibition.

Read the following report of the Judges at the show of flowers held in the Town Hall, on the 7th April, 1854.

On the fourth Floricultural Show of 1854, held at the Town Hall on the 7th April, the Judges have to report as follows:—

"There was a good show of plants on this occasion, notwithstanding the advanced period of the season, and though the collections were not large in number, the quality of the flowers produced was on the whole above the average.

"The show of orchids was the best of the season, and perhaps equal to that of any former year. There was a good show of Amaryllids also, and a fair representation of Asters and Cinerarias.

"Amongst *Onagraceæ* there were several specimens of the delicate white flower *Gaura Lindheimeria*, to which, being a novelty at the shows, a prize was awarded, though not included in the prize lists.

"The Hall was well attended by visitors, and of about twenty contributors to the show, fifteen obtained prizes to the amount of 103 Rs., which were distributed by the Vice-President, Rajah Pertab Chunder Sing."

(Signed) R. M. Thomas,
„ Benj. Warwick,
„ A. Grote.

The Gardener's monthly statement was then read :—

"In drawing up my report for the month of April last, it will no doubt be gratifying to the Society to learn that 144 Vanilla fruit are set on four of the young plants growing against the large almond tree at the eastern communication between the orchard and flower garden. The largest of these is at the present time rather more than eight inches in length and two inches in circumference, which, in comparison with the largest yielded by the same plant last year, shows an increase in length of two and a half inches. The American apple trees have already made good growth this spring, and are now in full flower. Four of the Avocado pear trees have flowered this season for the first time, and have set a few fruit. The several kinds of pine-apple plants now under different modes of cultivation in the garden—some of them being fully exposed to the rays of the whole day's sun, while more are partially, and a few wholly under the shade of trees,—are doing well, and have set a few fruit. The flowering of the *Gloxinea maculata*, in a great measure depends on the cultivation given to the plant at this season of the year, which ought to be as follows, viz.: when the plants or tubers have started into growth, turn the whole out of the pot, and carefully separate each tuber without breaking them, then pot each singly into a rather smaller pot, and as the plant advances in size, shift it again into a larger pot, which should be well washed and drained with pot sheds; over the pot

sheds spread a little moss or half decayed leaf mould, to prevent the compost from mixing with the drainage. This compost should be composed of equal parts of well decayed leaf mould, peat, and sand, the whole should be well mixed together, and broken fine before using. After potting, place the plants in the shade, and water gently from above for a few days, after which a good supply of water will be daily required by the plant to enforce a healthy growth. I have been induced to offer the above remarks on the treatment of this plant from the number that have been distributed from the garden during last year to many who may not be informed of the proper mode of their culture.

"The cropping of the Garden is nearly finished for this season with jute, *duncha*, Jubbulpore hemp, *Sida rhomboidea*, and acclimated American maize corn, together with a number of other kinds of small seeds.

"In conclusion, I have to add that the *Victoria regia* has again commenced to flower in the tank at the West side of the Rosery. Three flowers have been already fully expanded by the plant during the last ten days, and the fourth flower will be open to-morrow night. The new Water Lily, *Nelumbium luteum*, is throwing out fine large leaves, and may be expected to flower in a short time."

Notice of Motion.

Notice was given by Mr. W. G Rose, of the following proposal to be brought forward at the next General Meeting, it having been already approved by the Council :—

"That our Secretary, Mr. Blechynden, having proceeded to Europe for the benefit of his health, the sum of £40 sterling be remitted to him, to enable him to visit some of the principal gardens in Great Britain and France, with the view of his acquiring information, for the benefit of this Society, regarding the most important recent improvements in horticulture, and that the above sum be only devoted to pay the expences of his travelling in those places on the business here assigned to him by this Society."

Communications on various subjects.

1. From E. Solly, Esq., London, requesting the Society would aid him in collecting specimens of animal productions towards the formation of a General Museum of animal produce, which he is forming under the joint authority of the Royal Commissioners for the Great Exhibition of 1851 and the Society of Arts.

The Acting-Secretary submitted a list of a few specimens of silks, &c., in the Society's Museum, of which portions could be spared, and it was resolved that these be sent to Mr. Solly, provided in doing so the Society incurred no expense.

2. From W. G. Young, Esq., Under-Secretary to the Government of Bengal, forwarding an extract from Mr. Fortune's letter, dated 14th March, 1854.

3. From the same, forwarding for the information of the Society, copy of a despatch from the Hon'ble the Court of Directors, with its enclosed report by Dr. Royle, on the subject of the "Bast" produced in the province of Arracan. Referred to the Committee of Papers.

4. From W. Earle, Esq., stating that he had made over portions of the China rice sent by Mr. Fortune, to Baboo Rajkissen Soor, in charge of the Moyapore Magazine, on condition of his furnishing a full report of the treatment and results for the information of the Society.

5. From C. Horne, Esq., Bareilly, requesting the assistance of the Society in procuring some wheat and barley seed for him for the public garden he is organizing there.

The Acting-Secretary stated that he had circulated Mr. Horne's letter to the Members of the Grain Committee, soliciting their advice, and, according to their suggestions, he had written to parties in Monghyr and Jubbulpore, and that the Overseer of the School of Industry at the latter place had purchased five maunds of Nerbudda wheat, and Mr. Bean at Monghyr had kindly promised his assistance, and was now awaiting instructions to make the necessary purchases.

Resolved.—That Mr. Horne be written to for a remittance to carry out his wishes.

6. From the Rev. J. Long, regarding the number of boys he would wish to send to the Society's School, and how the expenses of their board would be defrayed.

The Acting-Secretary stated that the Council had referred this letter to the Garden Committee, under whose consideration the subject still remained.

7. From C. McDonald, Esq., Honorary Secretary Botanical Garden, Bhaugulpore, offering his best acknowledgments to the Society for the Chinese seeds sent him, of which the soap bean seeds had been destroyed by insects: the rest would have every attention.

8. From C. Beadon, Esq., presenting some papers on the practicability of supplying India with seed from the Seychelles, left with him by Mr. Lewis Jackson a short time since, and consisting of letters addressed to Mr. Jackson by the Colonial Secretary at Mauritius, and a report from Mr. Louys on the above-mentioned subject. Referred to the Committee of Papers.

9. From Captain G. E. Hollings, thanking the Society for the Chinese seeds, of which he would send some to Jhelum, where they were more likely to succeed.

10. From P. Carnegy, Esq., wishing to know on what terms he might have four times the quantity of seed to which he is entitled for the benefit of the Government Garden at Allahabad.

11. From Mr. J. Carter, London, regretting the failure of the last assortment of seeds, which he attributes to the transmission being too early in the season, or to their having been placed too near the engine in the steamer which conveyed them, and enclosing his receipt for £100 sent to him.

12. From Messrs. Grindlay and Co. acknowledging receipt of a Bank Bill for £75, which they have placed to the credit of the Society.

For all the above presentations and communications the best thanks of the Society were accorded.

It was suggested by some of the Members present that any valuable papers or communications of general interest that might come before the Society, should, after they have been submitted to, and approved by the General Meeting and Committee of Papers, be sent at once to the Calcutta Newspapers for gratuitous publication, if they would so receive them, in lieu of reserving them only for a tardy appearance in the Society's Journal. This suggestion was adopted by the Meeting.

(Saturday, the 17th June, 1854.*)*

The Hon'ble Sir Lawrence Peel, President, in the chair.

The proceedings of the last General Meeting were read and confirmed.

The following gentlemen, who were proposed at the last Meeting, were duly elected members:—

Khajee Abdool Guffar Saheb; Dr. McLean; Lieutenant-Colonel R. Horsford; Mr. H. Wright; Brigadier F. P. Story; and Mr. F. Schiller.

Motions.

The motion by Mr. W. G. Rose, of which notice was given at the last General Meeting, was then brought forward, and after some amendment was carried in the following form:—

That our Secretary, Mr. Blechynden, having proceeded to Europe for the benefit of his health, the sum of £40 sterling be remitted to him, to enable him to visit some of the principal gardens and farms in Great Britain, France, and other places, with a view of his acquiring information for the benefit of this Society regarding the most important recent improvements in Agriculture and Horticulture, with a special reference to the cultivation of flax and other fibres, and the mode of their preparation, and that the above sum be only devoted to pay the expenses of his travelling in those places on the business here assigned to him by this Society.

It was then proposed by Baboo Peary Chand Mittra, seconded by Baboo Gobind Chunder Sen, and carried:—

That Messrs. Rose, Haworth, Cantor, and Earle, be appointed as a Committee for drawing up special instructions so far as necessary to Mr. Blechynden for carrying out the objects of the above Resolution.

The Report of the Council on Mr. Mercer's proposals was then read as follows :—

"On reading the Report of the Finance Committee hereto annexed, the Council have to report that it is in their opinion inexpedient that either of Mr. Mercer's proposals should be carried out."

Report of the Finance Committee.

"The Finance Committee, after an inspection of the accounts of receipts and disbursements of the Society for the last three years, beg to report as follows :—

1*st*. That the average annual income for the three years 1851-52-53, was about Rs. 23,635, and the average annual expenditure for the same period was about Rs. 23,200, and the present number of members paying Rs. 8 per quarter is 499 ; consequently the proposed reduction to Rs. 6 per quarter would create a deficit of Rs. 3,992 per annum ; and therefore it appears to the Finance Committee that unless it be agreed upon that the capital of the Society may be encroached upon for this purpose, it is not expedient to adopt Mr. Mercer's proposal to reduce the subscription to Rs. 6 per quarter, as in the opinion of this Committee it is very doubtful whether the proposed reduction of the subscription would bring to the Society such an accession of subscribers as would make up for the deficit above alluded to.

2*nd*. With respect to Mr. Mercer's second proposal, the Committee beg to report that during the period when the sum for purchase of a life Membership was 150 to 160 Rs. only—that is from 1835 to 1838, or three years—47 members availed of the privilege, averaging more than fifteen per annum ; whereas from 1838 to 1853 the fifteen years during which the rate was increased to 400 Rs., only five members became life members by purchase.

3*rd*. and 4*th*. With reference to the third and fourth proposals, the Committee beg to subjoin a tabular statement of 75 members, who would, if these proposals were adopted, become free life Members during the next five years, causing a diminution of income (at the rate of thirty-two Rs. per annum) of 2,446 Rs. annually at the end of that period, and an immediate diminution from next year on the subscriptions of 16 members of 512 Rs. per annum."

Proposed by Mr. W. Haworth, seconded by Mr. R. Morrell, and carried :

That the Report of the Council be received and adopted.

Candidates for Election.

The names of the following gentlemen were then submitted as desirous of joining the Society :—

Shah Kubeerodeen, of Sasseram.—proposed by Mr. A. Grote, seconded by Dr. H. Falconer.

C. S. Boileau, Esq., C. S., Etah,—proposed by Mr. R. H. S. Campbell, seconded by Mr. W. H. Elliot.

Captain James Travers, 2nd in command Bhopal Contingent,—proposed by Dr. G. Tranter, seconded by Captain F. W. Brodie.

Cornet W. Shakespeare, Madras Light Cavalry—proposed and seconded by the same gentlemen.

A. Skinner, Esq., Hansi,—proposed by Dr. D. Scott, seconded by Mr. J. Ross.

Report.

The Gardener's Monthly Report for May was then read. Mr. McMurray states :—

" In the preparation of my Report for the month of May last, I have first to state for the information of the members and others, that I have now twelve hundred (1,200) Mango grafts of eighteen kinds, and two hundred and fifty (250) Peach grafts of thirteen sorts, besides a number of other fruit trees ready for delivery (at the reduced scale of prices) during the present issue season ; also three or four hundred musa (or plantain) plants of the following varieties will be available, viz. : Dacca, Chumpa, Martaban, and the Cavandishii. The three former kinds are becoming too crowded together to bear either large or good fruit. The Assam grass cloth, and tapioca plants may also be made available in large numbers. The Cabool and China walnut trees, presented to the Society by Major R. Ouseley and Arbuthnot Emerson, Esq., in August and September last, have made a good growth since that time where they are planted out, in an open plot in the orchard. The Manilla hemp plant, *Musa textilis*, contributed to the Society by Geo. Ackland, Esq., in August last, is now well established in the ground, and is beginning to send up suckers, which will be propagated from as soon as possible.

" The glazed case of orchid and pitcher plants from Mr. Simons, Assam, in exchange for fruit trees, was received on the 18th May, 1854.

" Mr. R. Blechynden's presentation of eight kinds of aloe, in all fourteen plants, were received on the 24th May last in pretty good condition.

" Mr. C. B. Stewart's contribution of two plants of *Nepenthes Sp.* from Penang were received on the 10th May last, in very good order.

" In conclusion, I have to state that the Victoria Regia plant, grown in the tank at the west side of the Rosery, has now seven leaves above the water, the largest of which is this morning three feet two and a half inches diameter, and which is increasing daily."

Presentations.

1. From the Asiatic Society, its Journal No. II, of 1854.

2. From R. McDonald Stephenson, Esq., through Messrs. Willis and Earle, a basket of Ceylon Sapan wood seed.

3. From Dr. McClelland, through the same—six samples of Pegu rice. The following is a copy of Dr. McClelland's letter to Mr. Earle on the subject of the seed paddy sent by him :—

"I send you, by the *Fire Queen*, addressed to the Agri-Horticultural Society, five samples of rice obtained from the bazar of this place.

One of the samples which I sent you before, and which I obtained at '*Yin dike quin*' in the line district, where it is cultivated, is not procurable at present in the Rangoon market.

You will know the kind I allude to which is the largest grain of all, with two singular looking bracts or glumes at the base of each grain. The Burmese name is *Ebea*. It is sown in June in the usual way and kind of ground, and is reaped in January.

The sample of small grained rice I now send, and which is not in the first samples, called '*Cha dha*,' is important from the fact of its ripening within three months of the date of sowing, for which purpose it requires to be transplanted into dry ground in the mouth of July. You will find a slip of paper in the bag with each sample, giving all the information I have been able to collect on the subject.

I like Burmah very much ; the climate is decidedly cooler than Bengal, the thermometer since the 16th instant, when the rains set in, has not been higher than 84 deg. or 86 deg., and at night all the year round it is cool. The rains fall in heavy showers, but are not incessant for days as in Calcutta. We have more cloudy weather during the rains than you have, without a much heavier fall, considering they begin earlier and last longer than they do in Bengal."

4. From H. Cope, Esq. Secretary of the Agricultural and Horticultural Society, Punjab—Sample of flax grown in the Society's Garden.

The sample has been referred to the Flax Committee.

5. From Mrs. Sturmer—two fig-trée plants and samples of the fruit, from the tree of the same kind.

Communications on various subjects.

1. From Major F. Hannay, Dibrooghur,—acknowledging the receipt of the Chinese and cotton seeds sent him, and promising a report in due time.

2. From J. H. Prinsep, Esq., Buttala,—states that No. 11 of the Chinese seeds sent him has germinated, and requests to have some information regarding the time of sowing the green indigo and hemp seeds.

3. From Mr. J. Carter, London,—encloses his receipt for £151-18 paid him, and promises to make up for the disappointment caused last year by the failure of the seed, by supplying them this year at the same rate, although they are scarcer and dearer.

4. From Messrs Smith, Elder and Co.,—acknowledging receipt of a bill for £25, which they have placed to the credit of the Society.

5. From Lieut. J. DeC. Sinclair,—offers to send some orchids and lilies that grow wild in the Chickulda Hills for the Society's garden, and applying for a packet of Chinese seeds, as he thinks they will succeed there.

Resolved that Lieut. Sinclair be written to, to ascertain the expense of sending down a case of the plants to Calcutta.

6. From the Secretary to the Local Committee, Baraset,—Report on the progress of the Agricultural class of the pupils in the Baraset School.

For all the above communications and presentations the best thanks of the Society were accorded.

(Saturday, the 8th July, 1854.)

The Hon'ble Sir Lawrence Peel, President, in the chair.

The proceedings of the last Monthly Meeting were read and confirmed, and the gentlemen who were proposed on that occasion were duly elected :—

Shah Kubeerodeen, Mr. C. E. Boileau, Captain James Travers, Cornet W. Shakespeare, and Mr. A. Skinner.

The names of the following gentlemen were submitted as desirous of joining the Society :—

Lieutenants E. K. O. Gilbert and E. V. Utterson,—proposed by Captain G. L. Cooper, and seconded by Mr. W. G. Rose.

C. B. Stewart, Esq.,—proposed by Mr. W. G. Rose, seconded by Mr. C. A. Cantor.

Capt. P. Salis,—proposed by Mr. W. G. Rose, seconded by Mr. W. Earle.

Lieut. W. S. Row and G. Rogers, Esq.,—proposed by Mr. W. G. Rose, seconded by Mr. W. Earle.

Capt. F. C. Jackson,—proposed by Mr. R. B. Garrett, seconded by Mr. W. G. Rose.

Capt. I. Campbell,—proposed by Brigadier J. Johnstone, seconded by Mr. W. G. Rose.

J. Agabeg, Esq.,—proposed by Baboo Peary Chand Mittra, seconded by Mr. W. G. Rose.

D. C. Mackey, Esq.,—proposed by Mr. F. Bellairs, seconded by Mr. W. G. Rose.

Presentations.

The following presentations were announced :

1. From A. T. T. Peterson, Esq., a bundle of Rheea fibre sticks, grown at his farm at Baraset.

2. From the Government of Bengal, through W. G. Young, Esq., Officiating Under-Secretary, a sample of Russian bast mat.

3. From S. F. Seymour, Esq., a specimen of Burmese rope.

4. From the Chamber of Commerce, its Half-yearly Report for 1854.

5. From the Government of India, through G. Cooper, Esq., Under-Secretary, 20 printed copies of Dr. Royle's Report on the Rheea and Hemp of India.

The Acting-Secretary was requested by the Council to make out a list of such persons as were interested in the growth of fibres, among whom they might be distributed.

6. From the Asiatic Society of Bengal, its Journal No. 3 of 1854.

7. From the Hon'ble Sir Lawrence Peel, a packet of Hollihock seeds of choice sorts for the Society's Garden.

8. From Baboo Peary Chand Mittra, a paper on the *Indian Agricultural Miscellany*, to be published in the next number of the *Calcutta Review*.

Reports.

The Report of the Special Committee appointed to draw up instructions to Mr. Blechynden for carrying out the objects of Mr. Rose's motion passed at the last Meeting, and their letter of instructions to Mr. Blechynden, were then brought forward, supported by the recommendation of the Council, and read as follows:—

To A. H. Blechynden, Esq.,

Secy. Agri. and Horti. Society of India, London.

Sir,—We beg to apprize you of our having been appointed by the last Monthly General Meeting of the Agricultural and Horticultural Society a Committee for drawing up special instructions, with a view to aid you in carrying out the objects of the following motion, which was passed at the June Meeting, viz :—

"That our Secretary, Mr. Blechynden, having proceeded to Europe for the benefit of his health, the sum of £40 sterling be remitted to him to enable him to visit some of the principal gardens and farms in Great Britain, France, and other places, with a view of his acquiring information for the benefit of this Society, regarding the most important recent improvements in Agriculture and Horticulture, with a special reference to the cultivation of Hemp, Flax, and other fibres, and the mode of their preparation, and that the above sum be only devoted to pay the expences of his travelling in those places on the business here assigned to him by this Society."

And in pursuance thereof we beg to advise you as follows :—

2. With respect to the selection of the Botanical and Nursery Gardens in Great Britain and France, which it may be advisable for you to visit with the object of acquiring useful information for our Society in mere Horticultural matters, we think that we cannot do better than leave this to your own good judgment, after you have consulted on the subject with Sir William Hooker, Dr. Royle, Professor Lindley, and any other eminent Botanists to whom you may hold letters of introduction.

3. You will no doubt be able to benefit the Society by consulting personally with Messrs. Carter and Company, of London, Messrs. Lawson and Sons, of Edinburgh, and some others of the principal seedsmen in London, Paris and Ghent, as to the selection, cost, and forwarding of the future supplies of seeds for the Society, and we recommend you to do so.

4. We would next call your particular attention to the terms of the motion referring to the cultivation and preparation of Hemp, Flax, and any other valuable fibres now cultivated in, or imported into Great Britain, and we recommend you to endeavour to learn before you leave London the most likely places for seeing the cultivation of Flax, and its after preparation under the different improved processes which have of late years come so successfully into operation. As regards the cultivation of this plant, it would be desirable to make inquiries as to the most favorable kind of soils, the description, amount of tillage, and kind of manures used, whether draining is considered necessary, and to obtain samples of the most approved seed, also of the dried plant in the straw, and of the same after it has gone through various stages of its preparation, until it becomes marketable Flax, with a note of the cost of the processes ; to obtain samples of the most approved Flax and Hemp, and of any other valuable fibres now cultivated in or imported into Great Britain, with a report of their market value. It is desirable that by personal inspection you should acquaint yourself with the old process of preparing the Flax from the straw by rotting, also to see the same done by Mr. Schenck's warm water apparatus, but above all to acquaint yourself with Mr. Watt's process of effecting the same preparation by high-pressure steam. To take notes of the apparatus employed, the quantity that could be prepared in a given time by a moderate sized apparatus, the cost of such, also the expence of converting a given quantity of Flax straw into a finished article.

It would also be very desirable for you to notice particularly the kind of machines, American and English, used in all the different processes for breaking and separating the woody matters from the fibre, and if you should consider any of them applicable to the preparation of Jute, Rheea, Maddar, Plantain, Aloe, and other fibres in this country, to possess yourself of such information respecting them and their cost, as would enable the Society hereafter to procure such if deemed necessary ; with the same view to obtain a list of the latest and best publications and reports, American and English, on the cultivation and preparation, and machines for the preparation of the hemp, flax, and other fibres, and the cost of the same. It would be well also to procure a small quantity of the best hemp and flax (Linseed) seed for the Society.

5. For the purpose of your prosecuting these enquiries effectually, we suggest the following places, which amongst others you might visit with advantage, viz., Belfast and the north of Ireland, where the Flax plant is

both highly cultivated and prepared to the greatest perfection, and it would be well to obtain an introduction to the Secretary of the Royal Flax Society, who no doubt would willingly give you the benefit of his knowledge, and a further introduction to such parties and places as to enable you to prosecute your enquiries with advantage.

In Glasgow you would, we believe, find Mr. Watts, the patentee of the latest improvement, in preparing flax by the high-pressure steam process. A letter to him, or to his Agents, before you commence your travels, stating your object, would probably obtain from him introduction to parties who have applied his process. At Leeds you would find some of the best Flax machine makers. Mr. Peter Fairbairn, for instance, who would also shew you through establishments there, manufacturing fibres from the coarsest sacking to the finest linen, but it is with the simple and light machinery used in the first preparation of fibres from the plant that requires your especial attention more than spinning and weaving machinery. In Belgium and at Courtrai, whence the finest Flax is obtained, you would have an opportunity of seeing the Flax grown under great care and attention, and also of seeing in use the old method of retting, as well as the hand machines so long and so much used in that country in its preparation, and it is probable that you would find their methods of working more suitable to the wants of this country than the more elaborate and scientific apparatus now so generally used in the North of Ireland.

6. We also beg to intimate to you our intention, before our Committee dissolves, of reporting to the Council of the Society our opinion that you will find the additional duties now assigned to you may probably require more of your time than your twelve months' leave of absence will admit of, as well as some further outlay for your travelling expences, and that we shall therefore recommend to the Society to grant you extension of leave of not exceeding three months, as well as such addition to the sum voted for your travelling allowance as you may find requisite, provided that the amount do not exceed £100 in all.

7. We feel satisfied that we may leave all other details to be regulated by your well known zeal for the interests and well doing of the Society.

We are, yours faithfully,

(Signed) Wm. Haworth.
„ W. G. Rose.
„ W. Earle.
June 29, 1854. „ C. A. Cantor.

Report of the Committee appointed by the Monthly General Meeting of the Agricultural and Horticultural Society of the 17th June, 1854, for drawing up instructions to Mr. Blechynden as to the best mode of carrying out the wishes of the Society in remitting to him the sum £40 for his travelling expences :

"The Committee beg leave to lay before the Council herewith a copy of their letter of instruction to Mr. Blechynden, framed by them in compliance with the wishes of the Society.

The Committee beg to call the attention of the Council to the circumstance, that after the sum of £40 had been proposed for Mr. Blechynden's travelling expenses with the view of visiting the gardens of England and France, it was suggested at the above Meeting that it was quite as desirable that Mr. Blechynden should have the means also placed at his disposal to make enquiries into Agricultural improvements, but more especially as regarded the cultivation and preparation of Hemp and Flax, and other fibre-giving plants, and a resolution to this effect was carried. It was also mentioned at the Meeting that to carry out this extended mission the sum voted would be too little. The Committee, on due consideration of the matter, feel called upon to submit to the Society their unanimous opinion that to enable Mr. Blechynden to do justice to the instructions about to be forwarded to him, it is quite necessary that his leave of absence be extended, and the amount for his travelling expences increased.

To meet the first, the Committee recommend an extension of leave to be granted, not exceeding three months, in addition to the twelve months already allowed him.

And to cover the extra travelling expences, that a further sum of not exceeding £60 be granted, making with the £40 already passed £100, and this Committee venture to hope that their recommendation to this effect may be brought before the next Monthly General Meeting, supported by the approval of the Council."

(Signed) W. G. Rose.
" Willis Earle.
" Wm. Haworth.
" C. A. Cantor.

The Hon'ble President then gave notice of the following Resolution, to be brought forward for confirmation at the next General Meeting, viz.:—

"That the recommendation of the Special Committee, which has been approved by the Council, that Mr. Blechynden's leave of absence be extended for three months, and the sum placed at his disposal for travelling expences be increased to £100, be confirmed."

The following Resolution, submitted to the Meeting by the Council, was then read:—

"That the Society award a premium of Co.'s Rs. 1,000 for submitting to it on or before the 1st December, 1855, the most approved specimen of not less than 50 mds. of Rheea fibre, the whole to be the produce of the cultivation of the party tendering it, and 10 maunds of which to become the property of the Society, to be accompanied by a detailed statement of the process

followed in its cultivation, and after preparation, and the cost of the same. The quality to be approved by the Society, and the Fibre to be in a fit condition for the English market."

Baboo Peary Chand Mitter then gave notice that he should move at the next Meeting that the above recommendation of the Council be adopted.

The recommendations of a Special Council Meeting, held on Friday, the 7th July, were then brought forward as follows :—

"The Society, having received by the last Mail the news of the death of the late Dr. Wallich, desire to place on record their deep sense of the valuable services rendered by him to the Society over a period of thirty-four years, during which he has been at different periods its Honorary Secretary, Vice-President, and Honorary Member, and their grateful acknowledgments for the services he has rendered to the cause of Horticulture and Agriculture in India."

The Hon'ble President, after dwelling at some length on the valuable services rendered to India and to this Society by the late Dr. Wallich, proposed that the Meeting should adopt the above Resolution. This was unanimously agreed to ; and it was then moved by Mr. W. G. Rose and carried :—

"That a copy of the Resolution be forwarded to the Widow of the late Dr. Wallich."

At this stage of the proceedings the Hon'ble President vacated the chair, which was then taken by Rajah Pertab Chunder Sing, Vice-President.

The following report from the Council was then read :—

"The Council, in submitting to the next monthly general meeting of the Society, the letter from the Hon'ble Sir L. Peel, resigning his office of President of the Society, express their great regret at the loss the Society is likely soon to sustain in being deprived of his valuable services, and do recommend that a suitable address be presented to him at the proper time, and that he be now requested to sit for his portrait to remain as a memorial in the Society's Hall, and that the portrait be a full length one, and that for the purpose of carrying out this object a subscription be collected amongst the Members of the Society, and that the surplus of such subscription, if any, be applied to the purchase of Medals, to be styled Peel Medals, for prizes at the Society's horticultural shows."

Moved by Mr. W. Earle, and seconded by Mr. W. Blundell, and unanimously carried :—

"That this Meeting, fully entering into the sentiments of the Council on the occasion of the resignation of their respected President, resolve that their recommendations be adopted and carried out."

The report of the Flax Committee on the sample of Flax sent by Mr. H. Cope, Lahore, was submitted :—

The Gardener's monthly report for June was then brought forward.

Mr. McMurray says :—

" In drawing up my Report for the month of June last, I have first to state that since receiving the Chinese green dye plant into this garden, that two hundred and fifty-four (254) more plants have been propagated and added to the original stock of twelve plants received from Mr. Fortune. The greater number of these plants are now fit for planting out into the open ground, which is under preparation for that purpose, and will be planted during the present month, so as to ascertain as soon as possible whether the constitution of the plant is likely to stand the climate of Bengal, or become a remunerative crop for cultivation in it, which will be duly attended to, and the result reported for the information of the Society.

The Chinese rice paper plant is also doing well, and has sent up one fine strong sucker from the roots, which will soon be ready for removing from the parent plant. When that takes place, and the sucker becomes well established in the pot after the shifting, the old plant will be transferred to the open ground.

The Chinese millet and rice seed, received from Mr. Fortune in February last, were sown on the 25th March following, have progressed satisfactorily up to the present time.

Of the thirteen kinds of Pegu rice seed presented to the Society by Mr. W. Ward (through Mr. Earle) on the 21st ultimo, and sown on the 22nd, the whole thirteen kinds have germinated very freely, and are doing well.

Seven good new kinds of plants were received from the H. C. Bot. Garden on the 20th June last in excellent order.

Mr. F. Frost's presentation of two kinds of Pegu rice seed, and one Camelia Japonica plant were received on the 10th instant in fair condition.

Sir L. Peel's contribution of twenty packets of the best English and Scotch sorts of Hollihock seed was received on the 7th instant in apparently good order.

Mr. C. B. Stewart's presentation of the following kinds of plants from Sydney, viz. 1 Podocarpus Spinulosus, 2 Araucaria Cookeii, 3 A. Cunninghamii, 4 A. excelsa, 5 Blanfordia nobilis, 6 Crinum longifolium, 7 Dendrobium speciosa, were received on the 7th instant in a very healthy state.

In conclusion, I have to add that the Victoria Regia plant has produced six new leaves since the date of my last report, the largest of which is rather more than three feet ten inches in diameter, and that the plants have again commenced to flower, and produced two fully expanded flowers since Sunday night last."

Communications on various subjects.

1. From Mr. D. Landreth, Philadelphia, enclosing bills of lading and invoice of seeds sent by him per *Scargo*, and requesting that as 50 bushels of Sea Island cotton seed have been forwarded by mistake, instead of 10, that the surplus be disposed of on his account at cost price.

2. From F. A. Glover, Esq., Mooteeharee, intimating that he is on the point of despatching the peach grafts for the Society, and that he has arranged about the expences of bringing them down.

3. From W. G. Young, Esq., Officiating Under-Secretary, Government of Bengal, stating that if the authorities at Bareilly are desirous of obtaining free transit of their seeds, that they should apply to the local Government.

4. Messrs. Grindlay and Co., handing their account current, which shews a balance of £10-18-2 in their favor.

5. The Hon'ble Sir Lawrence Peel tendering his resignation of the office of President of the Agricultural and Horticultural Society from the end of the current year.

6. From R. J. Hollingberry, Esq., requesting to be allowed a collection of plants from the Society's Garden to take with him to America, and offering to reciprocate by sending such American plants as the Society may want.

Referred to the Garden Committee.

For all the above presentations and communications the best thanks of the Society were accorded.

(Saturday, the 19th August, 1854.)

W. Haworth, Esq., Vice-President, in the Chair.

The proceedings of the last Monthly Meeting were read and confirmed.

The following gentlemen, who were proposed at the last meeting, were, duly elected members :

Lieutenants E. K. O. Gilbert, and E. V. Utterson, Mr. C. B. Stewart, Captain P. Saliz, Mr. G. Rogers, Lieutenant W. S. Row, Captain F. C. Jackson, Capt. Ivie Campbell, Mr. J. Agabeg, and Mr. D. C. Mackey.

The names of the following gentlemen were submitted as desirous of joining the Society :—

Brigadier Hill, Commanding Gwalior Contingent,—proposed by Capt. V. Eyre, seconded by Mr. W. G. Rose.

Lieut. H. S Bivar, 18th Regiment N. I., Junior Assistant Commissioner, Assam,—proposed by Lieut.-Col. F. Jenkins, seconded by Mr. S. Douglas.

Lieut. E. W. Barwell,—proposed by Dr. D. Scott, seconded by Mr. John Ross.

C. K. Dove, Esq., Deputy Post Master General,—proposed by Mr. W. G. Rose, seconded by Mr. S. Douglas.

P. Anderson, Esq., Calcutta,—proposed by Mr. W. G. Rose, seconded by Mr. C. A. Cantor.

James Findlay, Esq., Merchant, Calcutta,—proposed by Mr. W. Haworth, seconded by Mr. S. Douglas.

T. B. Bennett, Esq.,—proposed by Mr. W. Duff, seconded by Mr. W. G. Rose.

B. W. D. Morton, Esq.,—proposed by Mr. A. Grote, seconded by Dr. H. Falconer.

Presentations.

1. From J. R. Logan, Esq., *Journal of the Indian Archipelago*, Vol. VIII, Nos. 1. to 4.

2. From Messrs. R. Scott, Thomson and Co., a bottle of Gutta Percha Cullodion.

3. From F. A. Glover, Esq., 40 Peach grafts from Moteeharee.

4. From A. J. Sturmer, Esq., samples of Cotton and Flax, grown at Azimghur.

5. Lieut. F. W. Ripley, Akyab, 3 kinds of Tobacco seed, Havannah, Dutch, and Java.

Motions.

The motions of which notice was given at the last Meeting, were then brought forward as follows :

Proposed by Mr. W. G. Rose, in the absence of the President, and seconded by Mr. Montague, and carried :

"That the recommendation of the Special Committee, which has been approved by the Council, that Mr. Blechynden's leave of absence be extended for three months, and the sum placed at his disposal for travelling expenses, be increased to £100, be confirmed."

Proposed by Baboo Peary Chand Mittra, seconded by Mr. W. G. Rose, and carried :—

"That the Society award a premium of Co.'s Rs. 1,000, for submitting to it on or before the 1st December, 1855, the most approved specimen of not less than 50 mds. of Rheea fibre, the whole to be the produce of the party tendering it, and 10 mds. of which to become the property of the Society, to be accompanied by a detailed statement of the process followed in its cultivation, and after preparation, and the cost of the same, the quality to be approved by the Society, and the fibre to be in a fit condition for the English market."

The following motion was then submitted by Baboo Peary Chand Mittra, seconded by Stewart Douglas, Esq., and carried :—

1. "That this Society records with deep regret the death of Mr. Willis Earle, and desires to take this opportunity of publicly acknowledging its sense of his indefatigable exertions and lively interest on behalf of this Society, of which he was a member for upwards of 24 years.

2. "That a copy of this resolution be forwarded to Mr. Earle's relatives in England."

Reports.

The Report of the Garden Committee, as approved and recommended by the Council on the proposed improvement of the Society's Garden School, was then read as follows :—

Report of the Garden Committee of the Agricultural and Horticultural Society, at a Meeting held at the Society's Garden, on Tuesday, the 8th of August, 1854.

Present.

Messrs. W. G. Rose ; S. Douglas ; and C. A. Cantor, Members ; Rev. J. Long, Visitor; and Mr. S. H. Robinson, Acting Secretary.

The Meeting was held for the purpose of inspecting the state of the Garden School, with the view of rendering it of more utility than it has hitherto been, in educating a superior class of mallees, whose services may be hereafter available to the public, and thus being auxiliary to the improvement of Horticulture generally in India.

Your Committee, after inspecting the School-house, and examining the boys under instruction there, beg to report as follows :—

1*st*. The number of boys at present instructed in the School, is twelve only, half of their time being given to working in the Garden, and the remaining half to school instruction, the latter is of the most elementary description, being only such as is taught in the lowest grade of village schools ; these boys receive wages at the rate of Rs. 1-8 to 2 per month, and the total expense, including the instruction afforded to them, is on the average as follows :—

Wages to 12 Boys in all per month, ..	19	4	0
Wages to Schoolmaster, ...	6	0	0
Stationery, &c., ...	0	12	0
Rs., ...	26	0	0

2*nd*. In addition to the deficient school instruction they receive, another and greater drawback to their becoming experienced mallees is the practice they have of leaving the Garden employ altogether, as soon as they have learnt a little of their business, or sufficient to induce persons requiring mallees to give them higher wages, in the present difficulty of procuring good men for such work at all.

3*rd*. Your Committee are of opinion that a small additional outlay might be sanctioned by the Society, with the object of improving the School, and thereby encouraging the education of a superior class of mallees, and they conceive that such would be a very legitimate application of a portion of the Society's funds.

4*th*. The scale they recommend being adopted, is as follows :—

24 Boys' allowance at 1-8 to 2 per month, ...	38	0	0
A Head Schoolmaster, ...	12	0	0
The present Schoolmaster as assistant,...	6	0	0
Stationery per month, ...	2	0	0
Rs., ...	58	0	0

being a permanent addition of 32 Rs. to the present monthly outlay, and besides the above, a grant of Rs. 25, on opening the School, for purchase of maps and books ; and that accommodation be afforded to the additional number of boys proposed, by including in the School-room the adjoining room under the same roof, which is now used as a godown, and can be spared for the purpose.

5*th*. And lastly, they recommend that all boys admitted in future be bound as apprentices to the Society's Head-Gardener, for a term of five years, under Government Regulation XIX of 1851, and that the plan now proposed, be considered as an experiment, to be extended if the result proves successful.

6*th*. In closing their report, the Committee beg to acknowledge the assistance and advice they have received from the Revd. Mr. Long, of Mirzapore, near Calcutta, who has promised to visit the School periodically, and to take an interest in its progress.

(Signed) St. Douglas,
„ Wm. G. Rose,
„ C. A. Cantor.

Notice of motion was then given by C. J. Montague, Esq. :—

" That the report of the Garden Committee, recommended by the Council, involving an additional monthly expense of Rs. 32, and a present outlay of Rs. 25, on account of the Garden School be adopted."

The Report from the Translation Committee was next brought forward as follows :—

" The Translation Committee beg to recommend that the first part of the *Indian Agricultural Miscellany* (now out of print) be reprinted, it being in great request, and that all the numbers of the publication be sold at Two Annas per number.

The Committee beg further to recommend that a copy of each of the Nos. published be sent to the Government of Bengal, with a request to

know if it requires any number of copies for the Vernacular Schools, and the Libraries at Sudder Stations, in progress of promotion."

(Signed) Shib Chunder Deb.
" Peary Chand Mittra.
" Pertaub Chunder Sing.
" Horee Mohun Sen.

With reference to the above, the Council having recommended that the usual number of copies be reprinted and offered for sale at cost price, which is about Four Annas per copy, and that the second proposal of forwarding a copy of the Journal to Government, be carried out.

It was moved by Mr. W. G. Rose, seconded by Mr. R. Blechynden, and carried :—

" That the Report of the Translation Committee, as amended by the Council, be adopted."

The Gardener's Monthly Report for July, was then brought forward, as follows :—

In submitting my report for the month of July last, I have also the pleasure to forward you a tabular statement of the American vegetable seeds for 1854, wherein the result of each kind is exhibited, and from which it will be seen that the average per cent. of seeds vegetated this season is equal to that of last ; still, I do not consider the seeds in general so good, as is evident, and will be observed from the statement, that seven of the most important kinds of the seeds have wholly failed, although every possible attention and care were paid to their treatment while under trial, and two different sowings made before I was satisfied that the seed was bad, the mouldiness of the seeds when received, denoted that they had either been packed up in a greenish damp state, or that the cases had got damaged or wet on their passage, which caused fermentation to take place, and kill the germinating power of the seed.

The twenty kinds of Hollihock seed, presented to the Society by Sir Lawrence Peel, on the 7th, were sown on the 8th July. All the sorts have germinated freely, and the seedlings have been pricked out of the seed gumlah, and are doing well.

The Chinese green dye plant has been planted out in an open plot in the orchard, where it is now making a better growth than when kept in the pots.

Two more of the Victoria Regia seed, presented to the Society by the late Dr. Wallich, on the 8th November, 1851, have germinated during this month, after lying in the gumlah of mud and water for two years and nine months. Of the old Victoria Regia Plant, which flowered so magnificently last year, and up to the month of July of the present season, the leaves have, I regret to say, disappeared beneath the water, and the root is still apparently fresh

and firm on the mound, but little hopes of its recovery need be expected. This plant produced no perfect seed.

Rather more than half a biggah of the Jubbulpore Hemp plant is doing well this season in the Garden, from which I hope to gather a large quantity of seed during the cold season for sowing next spring on a much larger plot of ground, for the purpose of getting a quantity of the Hemp to compare with that from its native district.

Mr. C. Macleod's presentation of one Rose plant was received on the 30th July in a healthy condition.

In conclusion, I have to state that the fruit trees, shrubs, and other crops in the Garden, have made a healthy and vigorous growth during the past and present season.

Communications on various subjects.

1. From J. W. Dalrymple, Esq., stating that the Government were desirous of having two bushels of Sea Island Cotton Seed, for trial in Pegu.

The Acting Secretary intimated that two bushels of the Sea Island Cotton Seed just arrived from America, had been presented to Government in reply to the above.

2. From W. Jordon, Esq., dated Lima, 25th April. He writes as follows :—

"In consequence of having left England for this place in autumn last, I had only the pleasure of receiving your favor of 19th May, 1853, last week.

"Mr. Haworth's report on the New Granada hill rice, has been very gratifying to me ; as it confirms my assertion of the singular fact that it produces a succession of crops from the same seed.

"By this post I have written to a friend in New Granada, to forward to England two quintals of the same description of seed; taking care that it shall be as fresh and dry as possible : and Messrs. Bates, Stokes & Co. of Liverpool, to whom it will be consigned, will forward it to your address by the earliest opportunity, after its arrival.

"I much regret that so much time must necessarily elapse before you can receive the seed ; as I am convinced that in favorable situations, this rice should prove a valuable acquisition to India.

"In the province of Mariquita in New Granada, where it most abounds, it is found on the lower flanks of the Cordilleras ; and is generally sown on the slopes of the hills.

"Any further communication you may wish to make to me, have the kindness to direct to the care of Messrs. Bates, Stokes & Co., Liverpool, or direct to Lima."

Resolved.—That Mr. Jordon be specially written to with the best thanks of the Society for his contribution.

3. From Mr. D. Landreth, Philadelphia, enclosing invoice of a further shipment of Cotton and Tobacco seed to the care of Messrs. Grindlay and Co., London.

4. From Messrs. Grindlay and Co., relative to the above, shipped per *Maranon* for Calcutta.

5. From C. Horne, Esq., Bareilly, thanking the Society for the present to the Bareilly Gardens of a complete set of their Transactions.

6. From W. G. Young, Esq., states that the Lieutenant-Governor of Bengal, has granted permission to frank the cases of Cotton Seed for Major Hannay.

For all the above communications and presentations, the thanks of the Society were accorded.

(Saturday, the 9th September, 1854.*)*

William Haworth, Esq., Vice-President, in the Chair.

The proceedings of the last General Meeting, were read and confirmed.

The following gentlemen who were proposed at the last general meeting were elected members :—

Brigadier Hill, Lieut. H. S. Bivar, Lieut. E. W. Barwell, C. K. Dove Esq., P. Anderson, Esq., James Findlay, Esq., T. B. Bennett, Esq., and B. W. D. Morton, Esq.

The names of the following gentlemen were submitted as desirous of joining the Society :—

J. N. T. Wood, Esq., merchant, Calcutta,—proposed by W. G. Rose, Esq., seconded by R. Morrell, Esq.

R. Hampton, Esq., Collector of Backergunge,—proposed by C. Steer, Esq., seconded by R. Ince, Esq.

Lieut. G. M. Hall, 4th Regiment Irregular Cavalry, Hansi,—proposed by A. Skinner, Esq., seconded by D. Scott, Esq.

Baboo Kunny Loll Dey, Sub-Assistant Surgeon, Medical College, Calcutta, —proposed by Rajah Pertabchunder Sing, seconded by Baboo Peary Chand Mittra.

Rev. T. Boaz, L. L. D., Calcutta,—proposed by W. Haworth, Esq., seconded by S. Douglas, Esq.

S. H. Robinson, Esq., Acting-Secretary of the Society,—proposed by W. Haworth, Esq., seconded by W. G. Rose, Esq.

T. Brae, Esq., Indigo Planter, Jessore,—proposed by W. G. Rose, Esq., seconded by R. Morrell, Esq.

Presentations.

The following Presentations were announced :—

1. From the Asiatic Society copy of their Journal No. IV. of 1854.

2. From H. Cope, Esq., Secretary Agricultural Society of the Punjab, a sample of Silk produced at Lahore.

Referred to the Silk Committee.

3. From N. P. Crump, Esq., Monghyr, sample of Fibre grown in his garden.

Referred to the Flax Committee.

4. From Major Phayre, Commissioner of Pegu, two large samples of Bast from Rangoon, with four of the trees producing one of the kinds of the same article.

5. From J. Agabeg, Esq., a case of plants from Penang, including the Pine Apple and Penang Betel Palm.

6. From R. Fortune, Esq., a packet of Cabbage Oil Seed, and two specimens of cloth dyed with the Chinese green vegetable dye.

Motions.

The following motion, of which notice was given at the last General Meeting, respecting the Society's Garden School, was then brought forward, viz. :—

"That the Report of the Garden Committee, recommended by the Council, involving an additional monthly expence of Rs. 32, and a present outlay of Rs. 25, on account of the Garden School, be adopted."

Upon which it was proposed by Mr. C. J. Montague, seconded by Baboo Rajendraloll Mitter, and carried—

"That the Report of the Garden Committee, as recommended by the Council, be adopted."

Notices of Motion.

The following letter, addressed to the Council of the Society by the Acting Secretary, was then read :—

"Having been now four months Acting Secretary to this Society, I consider it incumbent in me to bring to your notice any matter connected with its working, which in the course of my duties may occur to me as susceptible of improvement.

Amongst other subjects I have noticed the disproportionate encouragement at present offered by the Society to Horticultural pursuits as compared with what is given to its other or Agricultural department, and being under the impression that the extent of this disproportion may not have been generally noticed by the Society, I have had a comparative statement drawn up and annexed hereto of the amounts expended under the two different heads, as far as I have found it practicable to divide them. From this it will be seen that the average annual expenditure of the Society for the last three years on Horticulture has been nett 13,816 Rs., more than two-thirds of the average total annual expenditure, against an average for the same period of 6,537 Rs. on Agriculture.

Should it be considered desirable to remedy this state of things, and apportion the expenditure of the Society more equally between its two

branches, I would suggest as one step towards effecting this object, the offering by the Society of periodical prizes for approved Reports or Essays on Indian Agricultural subjects, on the same principle as adopted by the Agricultural Societies at home. I think that were 1000 Rupees per annum of the Society's funds set apart for this purpose, say for two prizes of 500 Rupees each, it might be the means of collecting together valuable information, in a useful and practical form, on some of the most important Indian Agricultural staples, and the want of which is now frequently experienced.

I would suggest the usual practice be followed in such cases, of awarding prizes only for such Essays as might be approved by the Society, and for the approved papers to be considered the Society's property, for publication in their Journal, or separately as they might determine,—the Society, of course, affording to intending competitors any information already collected by them towards forming as complete and valuable a treatise as possible on each subject.

The choice of subjects would of course require the consideration of a Committee of the Society, as well as the conditions as to the amount of matter they should contain, and other similar details. I will merely in conclusion suggest the following as amongst the more prominent subjects on which probably valuable Essays might be elicited :—

For an approved Essay on each of the following subjects :—

1st.—On the progress and present position of Indigo cultivation in Bengal.

2nd.—On the position and prospects of Tea cultivation in Assam.

3rd.—On the Sugar Cane cultivation of the Benares and surrounding districts.

4th.—On the cultivation of Jute and other useful fibres in Bengal.

5th.—On the Tanning products of India.

6th.—On the production of Caoutchouc and Gutta Percha in India.

7th.—On the clearing and cultivation of the Sunderbunds of Bengal.

8th.—On Date Tree cultivation in Bengal.

9th.—On the relative cost and production of the various Oilseeds of India suitable for export.

10th.—On the progress of Opium cultivation in India, and its influence on other agriculture.

11th.—On the Silks of India."

The letter was accompanied by a recommendation from the Council to the following effect :—

"That the suggestions of the Officiating Secretary as to giving premia for Essays on Agricultural subjects be adopted, and that, if necessary, the funds required for this purpose be taken from the vested property of the Society, and that a recommendation to that effect be submitted to the next General Meeting, and that in the event of this recommendation being adopted, a

Special Committee be appointed for selecting the most practical subjects on which Essays are to be required, and for determining the amount of premium to be given."

Upon reading the above papers, notice of motion was given by Baboo Peary Chand Mitter in the following terms :—

"That the recommendation of the Council as to giving a premium not exceeding one thousand Rupees annually for Agricultural Essays be received now, and that it be taken into consideration and adopted at the next meeting."

A petition was then read from Beemchund Doss, Book-keeper in the Society's Office, for an increase of pay, with a recommendation from the Council that he should have an increase of 5 Rs. per month ; whereupon notice was given by Mr. C. J. Montague as follows :—

"That the recommendation of the Council respecting the increase of pay to Beemchund Doss of 5 Rs. per month be confirmed at the next Meeting, and that the increase take effect from 1st September instant."

Reports.

The Gardener's Monthly Report was then read. Mr. McMurray reports as follows :—

"In continuation of my report on the American Pettigulf Cotton Seed of this season's importation, I have now to state that the second batch of seed, was received in the garden on the 28th and sown on the 29th ultimo, from both the top and centre of the barrel from which the first trial sowing was made, and that the seed out of the centre has yielded seven (7) per cent, whereas that from the top has again totally failed under the same treatment, both samples having been sown side by side in the open ground, and in gumlahs placed in the Conservatory. From this circumstance it may be surmised that the barrel may have been placed on that end, and that in a damp part of the ship while on the passage to this port. The seed at the other end of the barrel may be perfectly dry, and the seed good, which I should say deserves another trial for further information on this important subject. The Sea Island Cotton Seed, presented to the Society by J. L. Nash, Esq., in December last from Mr. W. Sebrook's plantation in Eddesto Island, Charleston, South Carolina—stated to yield the finest description of Cotton yet produced, and which gained a medal at the Great Exhibition of all nations, and declared by the Manchester spinners to be the finest ever imported to England,—the plants obtained from this seed are now coming into a bearing state in the garden, the produce from which seems to yield a fine description of cotton, as will be seen from the accompanying three pods or boles.

The 'Kau' and 'Sooloor' nuts of the Sandwich Islands, contributed to the Society in March last by Mr. R. J. Hollingsworth, with other kinds of

seeds, have germinated. The first-named kind is one of the Cordia Sp., and the second is *Aleurites triloba*, or 'Ukhrot' of Bengal. The first sowing made this season in the garden of the acclimated American maize corn is now ripe, and will be forwarded to your Office next week for general distribution to the members. A few specimen cobs I now send for laying before the present meeting, which may be deemed equal to the original stock. Since the date of my last report one more of the *Victoria Regia* seeds, presented to the Society by the late Dr. Wallich in November, 1851, has germinated.

The forty peach and plum grafts and seedling plants, presented to the Society by F. A. Glover, Esq., were received on the 22nd July last in very good order.

Mr. A. D'Cruz's contribution of five seed kinds of Dahlia plants were received on the 5th instant in good condition.

Mr. J. Agabeg's contribution of two hundred and thirty-four Betelnut seeds, and fifteen Pineapple plants from Penang, were received in good order on the 7th instant."

The sample of Cotton referred to by Mr. McMurray was much admired by the Meeting, and it was ordered to be referred to the Cotton Committee.

Communications on various subjects.

1. From A. H. Blechynden, Esq., Secretary of the Society, dated London, 24th July, 1854. The following is extract from the letter :—

"I beg to acknowledge receipt of your letter of the 30th May, intimating that you had remitted to Messrs. Grindlay and Co., the sum of £30 to meet the cost of bell glasses, cast iron labels, and galvanized iron wire, for the use of the Society's Garden, in accordance with the recommendation of the Garden Committee, submitted in their report of March last. Will you have the goodness to inform the Society that I shall use my best exertions to execute this commission promptly and efficiently, and to obtain as many of each of the articles detailed as the amount placed at my disposal will admit.

I may take this opportunity of mentioning that I propose to submit to the Society of Arts, with a brief account of each, the specimens of oils detailed at the foot of this letter, which, by permission of the Council, I selected from our Society's Museum. Mr. Foster, the Secretary, with whom I have been in communication, has promised to insert such account in the Society's Journal (which is published weekly and is largely circulated) and to use, moreover, his best endeavours to bring them to the notice of persons interested in such articles.

I hope to inform you, in my next letter, what steps I have taken towards meeting the Society's commission for a new Medal-Die, and for gold and bronze medals.

1. The 'Jychee' of Rohilkund, or 'Titlee' of Gorruckpore, an Euphorbiaceous plant. I have just received from Mr. Bridgman, of Gorruckpore, a

dried specimen of this plant, which Dr. Royle has kindly promised to examine, and to give me the botanic name.

2. The 'Junglee Buddam,' *Sterculia fœtida.* See Mr. Haworth's notice of this fine oil. *Journ.* Vol. VIII, part 1, p. 39.

3. The 'Dessee Akroot' (*Juglans camirium*, or *Aleurites triloba* of Roxb.) See Dr. Riddell's communication to the Society. *Journ.* Vol. VIII., p. 4, p 220.

4. The 'Sirgoojah,' or Ramtil, *Verbesina sativa.* Roxb. *Journ.* Vol. VII, part 1, and Vol. VIII. part 1. p. 61.

P. S.—July 25, 1854.—I have seen Mr. Carter several times respecting the approaching season's supply of flower seeds; and for the reasons assigned in his letter to me, which I enclose, have thought desirable not to interfere with the proposed period of despatch. He told me, what I observe he has repeated in writing, that by a later despatch, even the commencement of November, he could not ensure the Society a collection of fresher seeds, (with exception of a few sorts) than what he is now preparing."

2. From Mr. Jas. Carter, Seedsman, dated London, July 22. Mr. Carter writes as follows:—

"I have the pleasure to inform you that I am now occupied with the preparation of the Flower seeds for the Agri-Horticultural Society, and I have every reason to believe that this year's collection will surpass all the former. As many of the seeds do not ripen till November, it would be detrimental to the interests of the Society to wait for the new crop, for it is generally the end of December before the whole, including the foreign, are received here. A few of the early flowering sorts, such as Viola and Calceolaria, ripen their seeds in good time, and shall be sent as far as possible of this year's growth. The Calceolaria will, I flatter myself, surpass anything ever sent to India, the seed having been saved from the finest English and Continental collections.

I propose forwarding the seeds at the usual time in August, which, under all circumstances, I consider the most favourable month for shipping, and I cannot help thinking that the failures of last season were in a great measure owing to the alteration of the time, for I feel convinced that the quality of the seeds was equal to that of former years.

In consequence of the disappointment experienced by the partial failure of last year's seeds, I shall, without extra charge, increase the number from 70 to 85, but I beg it to be understood that such additional packets cannot in future be sent without a proportional increase of the price. Among the additional seeds will be found Calliopsis, comprising splendid new varieties, Anemone, Jacobæa, 6 var., several new, Madaria elegans, &c., &c. The Œnothera, white and yellow varieties, are separated from the Godetias, which are mostly violet and purple, will be found desirable, as they differ so much from each other in size and habit.

In conclusion, I beg to say that everything shall be done to render the collection in every respect satisfactory, the mixtures will be found first-rate. The Asters, for instance, will comprise more than *fifty* varieties, many entirely new. Phlox upwards of 20 varieties, comprising the brightest and most beautiful varieties.

I must now conclude for the present, but shall be happy to give you any further information you may consider desirable."

3. From Lieutenant J. Williamson, dated Shaik Buddeen, 14th August, stating that he should be glad if a proposition could be originated by any of the members agreeing with him for reducing the annual subscription of members residing more than 800 miles from Calcutta to 16 Rs. per annum.

This letter had previously been submitted to the Council, who did not see the necessity for the proposed change. The meeting agreed in opinion with the Council.

4. From S. Mornay, Esq., Upper Assam, stating that he is cultivating a species of mulberry with large uneven entire shining leaves, one of which measured 15 inches long, and 11 inches wide : also that he is cultivating 20 acres with Rheea plant, and intends competing for the prize offered by the Society.

5. From Messrs. Grindlay and Co., acknowledging receipt of bill for £30., to be held at the disposal of Mr. Blechynden.

6. List of parties to whom the Acting Secretary proposed to distribute the twenty copies of the pamphlet on Rheea and other Fibres presented by Government to the Society. Approved.

For all the above presentations and communications the thanks of the Society were accorded.

(Saturday, 14th October, 1854.)

Baboo Gobinchunder Sein, Vice-President, in the Chair.

The proceedings of the last general meeting were read and confirmed.

The following gentlemen, who were proposed at the last general meeting, were elected Members :—

J. N. T. Wood, Esq. ; R. Hampton, Esq. ; Lieut. G. M. Hall ; Baboo Kunny Loll Dey ; Revd. Dr. T. Boaz ; S. H. Robinson, Esq., and T. Brae, Esq.

The names of the following gentlemen were submitted as desirous of joining the Society :—

Lieut. W. J. Gray, Artillery, Cawnpore,—proposed by Lieut.-Col. R. Horsford, seconded by Lieut.-Col. R. Houghton.

W. S. Hudson, Esq., Junior Assistant to the Commissioner of Assam, Mungledye, Durrung,—proposed by Lieut.-Col. F. Jenkins, seconded by W. G. Rose, Esq.

Lieut. F. G. Eden, 2nd in command, 1st Assam Light Infantry,—proposed by Capt. Dalton, seconded by A. Grote, Esq.

Lieut. A. K. Comber, Adjutant 1st Assam Light Infantry,—proposed by Capt. Dalton, seconded by A. Grote, Esq.

The Maharajah Issoree Persaud Narain Bahadoor, Rajah of Benares,—proposed by Rajah Suttochurn Ghosal Bahadoor, seconded by Baboo Pearychand Mittra.

Presentations.

The following presentations were announced :—

1. Sample of Rope made from the bark of the Custard Apple Tree. *Presented by S. F. Seymour, Esq.*

2. Specimen of Fibre produced from plants raised from one of the kinds of Chinese seed, received from Mr. R. Fortune. *Presented by Lieut.-Col. Hannyngton.*

3. Samples of Fibre produced from the Plantain, Pine Apple, Yucca, and *Hibiscus esculentus*. *Presented by Dr. Riddell, Bolarum.*

4. Two plants of Durian, from Mr. Edwards, Collector of Customs, Rangoon. *Presented by C. C. Mackenzie, Esq.*

5. A packet of New Zealand Maize seed. *Presented by the Rev. Dr. Boaz.*

6. Selections from the Records of the Government of India, on the suppression of human sacrifice and female infanticide in Orissa. *Presented by the Government of Bengal.*

Motions.

The notice of motion given at the last General Meeting, to the effect that "the recommendation of the Council as to giving a premium not exceeding one thousand Rupees annually for Agricultural Essays, be received now and taken into consideration, and adopted at the next General Meeting,"—was then brought forward, when it was moved by Baboo Pearychand Mittra, seconded by Mr. T. J. Watson, and resolved that the recommendation of the Council be confirmed.

Upon which it was moved by Baboo Pearychand Mittra, seconded by Mr. T. J. Watson, and resolved, that Messrs. A. Grote, W. Haworth, and Baboo Ramgopaul Ghose, be appointed a Committee for selecting subjects, and determining the amount of premia to be offered for Agricultural Essays.

It was afterwards suggested by the Acting Secretary that the name of Baboo Pearychand Mittra be added to those composing the Committee, which was agreed to.

The following motion, of which notice was given at the last Meeting was next disposed of, "That the recommendation of the Council respecting the increase of pay to Beem Chand Doss, of 5 Rs. per month, be confirmed at next meeting, and that the increase take effect from 1st September instant."

Moved by Mr. W. G. Rose, seconded by Baboo Gobinchunder Sein, and resolved that the recommendation of the Council be confirmed.

Reports.

The Report of the Committee of the Council appointed to wait on the Hon'ble Sir Lawrence Peel, with a request that he should sit for his portrait to be suspended in the Society's Hall, in conformity with the resolution passed at the July Meeting, was then brought forward. It stated that Sir Lawrence Peel had addressed a letter to one of their number, Dr. Falconer, dated the 18th August, again declining the request of the Agricultural and Horticultural Society for his portrait, and assigning reasons which leave no room for further solicitation.

The following letter, dated 18th July last, from the Hon'ble President, addressed to the Acting Secretary of the Society, was then read :—

"I have the honor to acknowledge the receipt of your obliging letter. The kind feeling evinced towards me by the Members of the Council and of the General Meeting who joined in the request to me which your letter conveys, is reward enough for any services which I may have rendered to the Agricultural and Horticultural Society of India. To have been honoured by the appointment which I held in the Society, and to have received so kind an expression of regret at the loss of my services which will shortly ensue, is really more than my services have merited, and so great an honor as having my portrait placed in its Hall, is one of which I cannot accept. I am averse to receiving any public honors which should in my opinion be rarely bestowed, and then only on men of an order of merit far surpassing mine. I am conscious that I have done little for the advancement of the most important interest of our Society, the promotion of Agriculture, and the stimulus which I may have given to Horticulture by following a very favourite pursuit, is not a merit of mine, though I may have been indirectly instrumental in promoting the Horticulture of India. Looking at the names which our Society has possessed and still possesses, I cannot place myself at all on a par with them : and as to the services of President merely, the appointment rewards me in the distinction and honor which it confers.

"It is a case of feeling on my part. My reasons may not convince others ; but I have a strong reluctance which I cannot overcome to the receipt of any mark of honor. Let me be kindly remembered by those whom I kindly regard, and that is all that I desire or can accept. The good opinion of the members of the Society will always be valued by me, and my poor services are at their disposal wherever I can be useful."

This was accompanied by a recommendation from the Council that a short abstract of the letter should be published. Upon which it was proposed by Mr. T. J. Watson, seconded by Mr. Joseph Agabeg, and resolved.—"That the correspondence with Sir Lawrence Peel on the subject of his portrait be published for the information of the Members of the Society."

The Report of the Sub-Committee of the Council appointed to take into consideration the proposal of the Chief Magistrate to convert the ground enclosed by the Calcutta Race Course into a public garden, was next read as follows :—

"The Sub-Committee having taken into consideration the several documents noted in the margin beg to report as follows :—

1. Letter from the Chief Magistrate of Calcutta to the Secy. to Govt. of Bengal, dated 3rd January, 1854.
2. Letter from Secy to Govt. to Secy. Agri.-Hort. Socy., dated 23rd January, 1854.
3. Report of Meeting of Sub-Committee held on 28th February, 1854.
4. Estimate of expences of balustrade and tank, from Mr. Robt. G. Rose, dated 27th May, 1854.

1. From the estimates before them, it appears to the Sub-Committee, that the probable preliminary expense of forming the proposed garden on a proper scale, would be about 30,000 Rupees, and the expence of maintaining it afterwards would also have to be considered.

2. The Sub-Committee are of opinion that such a garden would be a very desirable ornament to the City, and highly advantageous to the community as a promenade, as pointed out by the Chief Magistrate, but they do not consider it could be made otherwise than indirectly and partially subservient to the objects of the Agricultural and Horticultural Society of India. Whilst therefore the Sub-Committee cannot recommend the Society's taking a prominent part either in the management or expence of forming and maintaining such a garden, they consider the design as a public undertaking, would be well deserving the patronage and countenance of the Society.

3. They therefore are of opinion that the Society in their reply to the Secretary to Government, should strongly recommend its being encouraged, and that it should be intimated that the Council would recommend to the Society at once to aid the undertaking, should a public subscription list be opened, with a donation of 2,000 Rs.

(Signed,) H. Falconer,
„ A. Grote,
„ Ramgopaul Ghose."

Calcutta, 10*th October*, 1854.

It was then proposed by Baboo Pearychand Mittra, seconded by Mr. J. Agabeg, and resolved that the Report be published, and that its further consideration be postponed to next General Meeting, to give the Members generally an opportunity of considering the Committee's proposal in the interim.

The Gardener's Monthly Report was then submitted. Mr. McMurray writes :—

"In drawing up my report for the month of September, I have first to state that the Rattoon crop of Sugarcanes cultivated in the Garden this season have made a very luxuriant growth, and will be at full maturity by the end of this month, when the whole crop, amounting to some where about eight thousand (8,000) canes may be offered to the Members and public at the fixed scale of charges. The names of the canes under reference are as follows, viz., Mauritius, Singapore, Striped Bourbon, Otaheite and China. Twenty-five sorts out of the twenty-eight kinds of Cape Vegetable Seeds, now under trial in the Garden, have already germinated very freely. A tabular statement of the percentage will be submitted for laying before the next general meeting of the Society.

The Jubbulpore Hemp plant, under cultivation in the Garden, has had a fair trial this season, and may now be considered a crop that will grow well in Lower Bengal during the rainy season ; but from the plant being very subject to the attacks of insects on the stems, it is yet questionable whether the fibre will be as good as that produced in the native locality of the plant, or that the crop will be sufficiently remunerative to recommend its cultivation on a very extensive scale until further information be received. The insects attack the crop at an early stage of its growth, and before the plants reach full maturity the action of the wind on the crop breaks the whole of the stems that have been severely attacked by the insects, from two to three feet above the ground. From these stems I have been trying to find out what length of time the fibre may require in the steep, and have ascertained that three days will be about sufficient for that purpose, but it must be observed that this experiment was tried on a small scale, and that a common sized three feet girth sheaf may require more or less time in the water.

The Chinese wild and cultivated green dye plants have made a splendid growth since planted out in the open ground. The latter kind in particular is a robust grower ; both sorts are likely to do well in the climate of Bengal at all seasons of the year.

The blue dye plant, also received from China, and called the "Justicia species," is not at present likely to succeed so well as the above two sorts. The Chinese rice paper plants are doing well, and have been increased in number since the date of my last report on these plants.

The four "Durian" seedling plants, presented to the Society by Captain Weston in November last, were planted out in the open ground at the commencement of the rains this season, and since that time have made two feet high of a very healthy growth, and thrown out many side branches.

Mr. J. St. Burton's contribution of one plant of lime-tree and another of Nymphæ rubra, were received on the 9th September in a healthy condition.

Captain G. A. Grainger's present of the following excellent sorts of plants from Singapore were received on the 9th September, in very good health; viz., 7 Nepenthes Rafflesiana, 5 Orchids, 2 Naphelia species, 1 Hoya species, 6 Lycopodium species, and one other plant, apparently a Hoya.

Major Phayre's contribution of four Sterculia species of plants were received on the 13th September in good order."

A recommendation from the Council was next submitted, founded on the following memorandum, and enclosed from the Secretary of the Society, dated Perth, 23rd August, 1854:—

Memorandum.

Having had an opportunity, during my recent visit to Edinburgh, of seeing the beautiful and extensive nursery grounds of Messrs. Peter Lawson and Sons, and of ascertaining the means at their command of raising seeds, and of obtaining supplies from other nurseries in Great Britain as well as on the Continent, I am more than ever anxious that the Society should make another attempt to procure a consigument of vegetable seeds from them, preparatory, as I hope, to further and larger annual supplies. With this object in view I have ventured to place myself in communication with them, and enclose copy of my letter, and their reply, in original, for submission to the Council.

In regard to expense, it will be observed that Messrs. Lawson and Son's estimate amounts to £159-11, or say Rs. 1,600,= Rs. 2-10-9 a parcel consisting of twenty-six sorts of lighter seeds, six sorts of peas, and four of beans, or thirty-six papers in all; something more must be added for boxes and packing charges—say 5 as. 3 p. or Rs. 3 a parcel. I think this will be found as cheap, if not cheaper than Messrs. Villet and Son's annual bills, their charge being, I believe, Rs. 3-8 per parcel, including all expences of packing, &c. I think the quantity of the lighter sorts of seeds, which Messrs. Lawson propose giving is more than what Messrs. Villet supply; the peas and beans may be about the same, or rather less.

As respects the quality of produce raised in India from the Cape and Scottish seeds respectively, experience has proved the latter, with exception, perhaps, of a few kinds, to be superior to the former: this remark holds good, I believe, to most parts of the country, but more especially to Upper India.

With reference to the period of despatch: it may be deemed desirable to have two despatches, as proposed by Messrs. Lawson, viz., one in December and the other in January. The first would reach Calcutta at the close of April, and could be distributed to the Society's *up-country Members* in May, reaching the most distant before the commencement of the rainy season, and thus prevent their being subjected to a long dawk banghy journey in damp

weather. Many of the Mofussil subscribers, especially those in the Punjaub, complain that the Cape and American seeds reach them late in the season : they might, were these suggestions adopted, commence their first sowings with Scotch seeds. The second despatch would reach Calcutta in time for distribution before the setting in of the rainy season : and *Town Members* might exercise their discretion as to the time of sowing.

As this would be merely an experimental consignment, the period of transmission being changed, it may not be deemed desirable, with reference to the large annual supplies from North America and the Cape, to appropriate so large a sum as Rs. 1,600 and upwards for an additional order. If so, it might be reduced one-half in amount, giving only one-half the quantity of seeds in each of the 600 parcels. This, of itself, will be a good addition to each Member's annual supply, for it will be observed that Messrs. Lawson have estimated the quantity in each parcel as sufficient to plant out an acre of ground.

In conclusion, I may add that the consignments of Edinburgh seeds of 1851, and 1852, were received in Calcutta, to the best of my recollection, in August or September, and were, consequently, four months older, on arrival, than those now proposed to be despatched will be.

MESSRS. PETER LAWSON AND SONS.

Edinburgh.

GENTLEMEN,—Referring to your letter to my address of the 3rd January last, (received in March, a day or two previous to my departure from Calcutta,) and to my recent conversation with your Mr. Charles Lawson, will you have the goodness to furnish me, at your earliest convenience, with replies to the following queries, for the information of the Agricultural and Horticultural Society of India:—

1*st.* What would be the probable cost of a consignment of vegetable seeds *in bulk* (not put up in paper) at the wholesale rate, consisting of as many sorts as were included in the consignment of 1852, and sufficient to meet the wants of 600 subscribers, each having moderate sized kitchen gardens of about an acre ?

2*nd.* What would be the probable cost, in addition to the above, of say five or six of the best descriptions of peas, and for four of beans ?

3*rd.* If such consignment were despatched,—say about the middle of January next,— would it consist of seeds of the freshest sorts ?

4*th.* Whether in your opinion, such consignment, if sent by *a sailing vessel, viâ* the Cape of Good Hope, would reach in good condition, after a voyage of, say, four months ? The charge for freight, on a large supply of such bulky articles as vegetable seeds, by the overland route, would be great in proportion to the cost of the seeds.

5th. If the consignment of 1851 was sent *in bulk* or put up in paper? I have some recollection of the Society obtaining a supply of seeds from your house, in bulk, but it may have been the small trial assortment which you despatched in 1849 or 1850.

I am, &c.,
(Signed) A. H. Blechynden.

Edinburgh, 19*th August*, 1854.

A. H. Blechynden, Esq.,
Secy. A. & H. Socy. of India.

Edinburgh, 19*th August*, 1854.

Sir.—In reply to your letter of to-day, we annex note of the probable prices of the vegetable seeds, same sorts as we sent to Calcutta in 1851-52. We have put down the wholesale prices so far as we can judge at present, but as many sorts of garden seeds are not yet harvested, some slight alterations may be expected with regard to the prices of a few of these.

The quantities of the seeds on other side are what we calculate necessary to make up 600 collections of same size as those sent in 1852; you will of course be better able to judge than we can, if this quantity is sufficient for the subscribers' gardens.

The cost will therefore be thus:

1*st.* Consignment of vegetable seeds in bulk sufficient to make up 600 collections fully as large as sent in 1852, ...	£ 87 3 4
2*nd.* Collection of peas and beans sufficient to make up 600 collections of 9½lb. each, ...	72 7 1
	£159 10 5

These are the cost, exclusive of packages, &c.

If a consignment, such as the annexed, were despatched by us about the middle of January next, we would be able to supply all of the new seeds, and of the very best description. With regard to the forwarding, it is our opinion that if properly packed, they may be sent *viâ* the Cape of Good Hope, without danger, and we should recommend their being sent in two despatches, that is, one half in December, and the other half in January. The consignment we sent in 1851, was put up in paper, same as in 1852.

Hoping to be favored with your further commands, which will claim our very best attention,

We remain, Sir, your most obedient servant,

Peter Lawson and Sons.

The Council recommend that a further trial should be given to Messrs. Lawson and Sons' seeds, by ordering as part of the Society's next year's

indent, one half the quantity mentioned in their letter, in lieu of one half of the Cape seeds now annually received from Messrs. Villett and Sons.

This recommendation was adopted by the Meeting.

Communications on various subjects.

1. Letter from the Secretary of the Society, dated London, 8th August, 1854, of which the following is an extract :—

"In continuation of my letter of the 24th ultimo, I now beg to advise having executed the commission, with which the Society has entrusted me, for certain articles required for its garden. After making careful enquiries in various quarters, and with the assistance of Mr. Carter in obtaining estimates from other Firms, with which to test mine, I have instructed Messrs. Cottam and Hallen, of 76, Oxford Street, the well known makers of Horticultural implements, to furnish the galvanized wire fence and cast iron labels; and Messrs. James Hetley and Co., of 35, Soho Square, to furnish the propagating glasses. You will observe from the enclosed memo. which I have given in detail, for the sake of future reference, and with the view of checking Messrs. Grindlay and Co.'s account, that the sum (£30) remitted to Messrs. Grindlay and Co., on this account, being insufficient to meet the cost of the articles, to the extent mentioned in your letter of the 30th May, I have ordered Messrs. Cottam and Hallen to send only one half the quantity of iron fence, or sufficient to enclose *one acre instead of two*. The additional quantity can readily be obtained hereafter should it be required. I have requested Measrs. Grindlay and Co. to forward the boxes by the first opportunity *viâ* the Cape, duly advising you of their despatch. I have warned Messrs Hetley and Co., to pack the glasses most carefully in nests of ten each, and I hope they may arrive in an undamaged state.

Referring to the last paragraph of my former letter, will you have the goodness to inform the Council that I have intrusted Mr. James Pinches, of 1, James Street, Haymarket, with the execution of a new set of medal dies for the Society. I enclose copies of Mr. Pinches' letter and my reply. It was agreed that the new dies should be smaller than the old ones, about the same size as the College of Fort William medal. On showing the proposed size to Mr. G. G. Adams (a very rising Sculptor and Medallist) he recommended a size larger, similar to the medals which he has lately produced to commemorate the opening of the Crystal Palace : and this size I have given to Mr. Pinches for his guidance. The design will be similar to that of the old dies, but improved on in execution, and made, in every respect, more a work of art. I procured estimates from Messrs Adams, Wyon and Jarrett : the estimates from the two former are much higher than the amount set apart by the Society for the purpose. Mr. Jarrett's estimate (which Messrs. Grindlay and Co. obtained,) was less by about £10 than that of Mr. Pinches, but being an unknown artist, I thought it preferable to give the work to the

latter, who has prepared, in good style, medals for other foreign Societies, and has promised to exert himself to give satisfaction to our Society. It will be seen from the memo. annexed, that the amount will exceed by about £22 the sum remitted to Messrs. Grindlay and Co ; but that estimate, which was drawn up by me, was a very low one. Messrs. Hamilton and Co. offered to get the work performed for £40, and Messrs. Charles Nephew and Co. or Lattey Brothers (I forget which) for £30. I ascertained, however, on my first visit to Mr. Foster, that it could not be well done by a London Medallist for the latter sum: he informed me that the Society of Arts had, unfortunately, employed a Birmingham artist to prepare a new set of dies for the same sum, but it was so indifferently executed, that they have been obliged to set it aside. The cost of bronze medals, with clips, he calculated at 10 shillings each, exceeding considerably Mr. Pinches' estimate. I have every hope Mr. Pinches will prepare the dies in a satisfactory manner. I may add that no exertion has been wanting on my part to secure the services of a good artist, willing to perform the work at a tolerably moderate cost."

2. From the Secretary, dated Perth, 23d August, 1854, of which the following is extract :—

"I made a careful inspection of Messrs. Lawson's extensive nurseries occupying upwards of 100 acres, and also of their large seed warehouse, and was much pleased with both. They likewise shewed me the large collection of specimens of Agricultural and Horticultural produce, made in wax, which they have prepared by desire of the British Government, for the Paris Exhibition. They have given me in exchange for some Indian seeds, a small assortment of grass seeds, which I propose sending by an early opportunity, for trial in the Society's garden : it may be that a few of them may prove desirable to introduce into India. I availed myself of this visit to Edinburgh to inspect the experimental gardens of the Caledonian Horticultural Society, the gardens and museum of the Royal Botanic Society, and the museum of the Highland and Agricultural Society of Scotland. In the absence of Professor Balfour, Mr. McNab, the head-gardener of the Botanic Society, has promised me some very fresh seeds, which they are now gathering, of various kinds of grasses, which they grow as specimens merely, and some of which, three or four in particular, I imagine may prove desirable introductions into the Upper Provinces : they are long rooted, much more so than the Guinea grass, seeking for nourishment at a good depth below the surface of the soil, and consequently not liable to be so readily destroyed by drought. In a country like India where thousands of cattle die annually for want of provender in the hot season, such a grass, could it be fairly introduced, would prove a most valuable boon. I will send this assortment of seeds by an early opportunity, and would ask Mr. McMurray's usual attention to them, that they may be fairly tested. All my attempts to obtain seed of the "Brazilian grass" (*Panicum spectabile*) have, I regret to say, hitherto failed : this

grass would, I think from the accounts I have read of it, stand the drought of an Indian summer. I will still use my best endeavours to procure a supply."

3. From Lieutenant-Colonel Jenkins, Commissioner of Assam, reporting a depreciation in the quality of potatoes produced in the Cossyah Hills, and requesting the aid of the Society in procuring fresh seed.

4. From C. M. Villet and Sons, with invoice of Cape seeds per *Edith*, and advising having drawn on the Society for value thereof, Co.'s Rs. 2,160, at 30 days' sight.

5. From Smith, Elder and Co., forwarding their account current to 30th June, 1854, advising despatch of sundry books by order of Mr. Blechynden.

6. From Lieutenant-Colonel A. Bogle, requesting a large supply of Garden seeds per first steamer to distribute amongst the native malees of that Province.

7. From Mr. James Carter, advising despatch of six cases flower seeds, per P. and O. Company's Steamer, and acknowledging receipt of £151-18s.

8. From E. Solly, Esq., tendering best thanks for the parcel of specimens of annual products received from the Society, and offering to reciprocate any information on the subject of his pursuits.

9. From Major G. E. Hollings, intimating his intention of sending to the Society specimens of cloth, thread, and twine, made of acclimated American Cotton grown there, and reporting that the Petti-Gulf Cotton seed received from the Society, has germinated very freely.

10. From S. F. Seymour, Esq., forwarding specimen of Rope made from the bark of the Custard Apple tree.

11. From Lieutenant-Colonel Hannyngton, advising despatch of a specimen of fibre produced from the plants from one of the Chinese seeds sent by Mr. Fortune.

12. From R. Riddell, Esq., advising despatch of samples of fibre from the plantain, pine apple, and Yucca, and requesting the Society's opinion upon them.

13 From C. C. Mackenzie, Esq., forwarding two plants of Durian from Mr. Edwards, Collector of Customs at Rangoon.

14. From Messrs. Grindlay and Co., acknowledging receipt of Bill for £40, to be at the disposal of Mr. A. H. Blechynden.

For all the above presentations and communications the thanks of the Society were accorded.

(Saturday, the 11th of November, 1854.)

W. G. Rose, Esq., Senior Member present, in the chair.

The proceedings of the last general meeting were read and confirmed.

The following gentlemen, who were proposed at the meeting, were duly elected Members :

Lieutenant W. J. Gray ; W. S. Hudson, Esq., ; Lieutenant F. G. Eden ; and Lieutenant A. K. Comber.

The names of the following Gentlemen were submitted as desirous of joining the Society :—

C. N. W. Begbie, Esq., Merchant, Moulmein,—proposed by H. G. French, Esquire, seconded by Dr. C. Huffnagle.

Edward Harcourt Longden, Esq., Agra,—proposed by W. Anderson, Esq., seconded by S. H. Robinson, Esq.

W. H. Poe, Esq., Solicitor, Calcutta,—proposed by W. G. Rose, Esq., seconded by R. W. G. Frith, Esq.

The Hon'ble Major General James Low, C. B.,—proposed by A. Grote, Esq , seconded by Dr. H. Falconer.

Presentations.

The following presentations were announced :—

1. Specimens of 5 bundles of Shaws, and a small bundle of 2 kinds of Shaw Rope. *Presented by Lieutenant F. W. Ripley.*

2. Sample of Jute grown in the Le'Mroo River. *Presented by Lieutenant F. W. Ripley.*

3. Samples of Cloth, Thread, and Cleaned Cotton, prepared from a successful cultivation of American Cotton seed at Shahpore. Also specimens of cloth, floss, and fancy needle work, made from the fibre of the Muddâr plant dyed at Shahpore. *Presented by Major G. E. Hollings.*

4. Sample of Fibre from a jungle plant in Midnapore. *Presented by G. F. Cockburn, Esq,.*

5. A plant of *Raphostemma pulcherrima*. *Presented by B. Warwick, Esq.*

Reports.

The Report of the Sub-Committee appointed to consider the project of the Chief-Magistrate, for converting the ground enclosed by the Race Course into a public Garden, the consideration of which was postponed from last general meeting, was then brought forward. After some discussion, it was moved by Mr. Jos. Agabeg, seconded by Mr. Jas. Hill, and resolved :—

"That in consequence of the paucity of Members present at this Meeting, the consideration of the question be again postponed till next General Meeting."

The Acting Secretary next reported to the Meeting a loss of about 150 Rupees sustained by the Society, being the value of 2 cases of American Cotton and Tobacco seed ordered from Mr. D. Landreth in January last to be sent from Philadelphia *viâ* Southampton. The cases were forwarded

from England in the Ship *Maranon*, wrecked at the Sand Heads about a month since, and were not insured. Upon which it was :—

Proposed by Mr. W. G. Rose, seconded by Mr. R. Blechynden, and resolved,—" that in future *all* supplies of seeds for the Society shall be insured against sea risk."

The Gardener's Monthly Report for October, was then read. Mr. McMurray writes :—

" In continuation of my Report for September last, I have now the pleasure to forward you a tabular statement of the result of the Cape vegetable seeds for 1854, from which it will be seen that the average is rather more than seventy per cent, which may be deemed a fair produce.

Mr. J. Carter's packet, containing eighty-six kinds of English flower seeds, were sown on the 25th October, in gumlahs, and placed in the Conservatory, of which seventy-six sorts have germinated freely. The ten kinds not yet up are not a sufficient length of time in the soil to enable me at present to offer an opinion on the quality of the seed, but I will refer to them in my next report.

The two kinds of Chinese fibre-yielding plants called in that country ' Tuck-ma' and ' Tung-ma,' of which seed was received from Mr. Fortune in February last, have turned out to be the same kind of plants as the wild ' Petaree' (or *Sida Asiatica*) and Jute *(Corchorus olitorius)* of Bengal. The *Sida rhomboidea* yields a fine description of fibre, as will be seen from the small quantity prepared in the Garden and forwarded for laying before the present meeting, which may be considered equal to in every way, if not better than, the finest description of flax fibre ; and from the robust habit of the *Sida Asiatica* in its jungly state, and the thickness of the bark, there is every reason to believe the plant would produce an abundance of fibre if brought under careful cultivation. The plant is now ripening its seed, of which a quantity will be gathered for sowing a plot of ground in the garden at the commencement of the next rainy season, so as to find out its capabilities as a fibre yielding plant.

The old stoles of the Rheea plantation growing along the west boundary of the Garden are now flowering very freely, from which it is to be hoped a quantity of seed will ripen or come to maturity for issue ; in addition to this a large number of cuttings of the Rheea plant have been propagated, and are now ready for issue to the members.

The trial sowing of the Chinese cabbage oil plant yielded one hundred per cent., and germinated very freely when sown in the open ground ; but unfortunately the hares have destroyed nearly every plant although protected by netting.

Captain Weston's presentation of twelve bulbs of *Gesnera tubiflora* were received on the 26th October in a healthy condition.

Mr. B. Warwick's contribution of one plant of *Raphostemma pulcherrima* was received on the 9th inst. in very good order.

In conclusion, I have to add that somewhere about one thousand cabbage plants in the Garden may be made available to the Members."

The Report of the Silk Committee on the specimen of Raw Silk received from Mr. H. Cope, Lahore, manufactured there from cocoons reared on the spot, and laid before the August meeting of the Society, was then read as follows:—

"I have carefully examined the sample of silk, consisting of four skeins, one of which I have opened to enable me to examine it thoroughly. It is a very beautiful sample in every respect, about equal to the best French or Italian Silk, and in the present depressed state of the Silk market at home, worth about 20 shillings per lb. in London.

WM. G. ROSE."

"On the 4 skeins of the Lahore Agricultural and Horticultural Society's Raw Silk, grown and manufactured at Lahore, (see Mr. Henry Cope's letter, August 8, 1854, and Secretary Calcutta Agricultural and Horticultural Society's letter, August 30, 1854.)

I find this Silk very fine, very even, very clean, and very strong, in good fair condition, and of lively pale yellow colour.

In its manufacture it resembles the Europe made Silks, and would rank with them in value.

In manufacturing raw silks attention should be given to the production of those of more full body, as well as of the more fine; the demand is often changing for silks of the various kinds of fineness.

JOSEPH WILLIS."

The next report was that of the Cotton Committee on the specimen of Cotton grown in the Society's Garden from seed from Mr. Seabrook's plantation in Eddesto Island, Charleston, South Carolina, which estate produced a sample of Cotton which gained a prize at the London Great Exhibition.

The Committee report as follows on the sample, which was laid before the Society at their September Meeting:—

"This Kupass is a beautiful specimen of Sea Island Cotton grown in the Society's Garden. It is extremely fine and silky, whilst the fibre is long and strong, and the complexion bright and excellent.

I have seen many fine specimens of S. I. Cotton grown in this country and elsewhere, but nothing to equal this, and if the Society could import a few maunds of this identical seed cotton, it would be worth while to cultivate a few beegahs of it in the neighbourhood of Calcutta, and thus give it a fair trial, even on an increased scale of expenditure, for there cannot, I think, exist a doubt that this cotton, if properly picked and cleaned, would fetch at home a price of 24*d.* to 30*d.* per lb., which should be amply remunerative.

CALCUTTA, *4th November*, 1854. JAMES COWELL."

"On the three heads of Kupass produced in the Society's Garden from Sea Island Seed of Mr. Seabrook's plantation in Eddisto Island, Charleston, South Carolina. Under-Secretary's letter, September 14, 1854.

These three heads of Kupass present a cotton of singularly superior character and quality in all respects, and it would doubtless command the highest prices of the best Sea Islands in England.

The pods appear to me to be rather limitedly furnished with fibre; but if on a proper estimate, if it could be made by the Gardener, it could be shewn that the cultivation, &c., could be accomplished maund per maund at a cost of three or four times that of the common country cotton, there would still remain a very large margin of profit for the adventurer.

It would be well worthy of trial in suitable marine soils of India, and where the climate also might be found most congenial.

JOSEPH WILLIS."

"I have examined the small quantity of Kupass, raised in the Society's Garden from the seed presented by Mr. J. L. Nash, and I quite agree with all that Mr. Willis states in his report respecting its extraordinary fine quality; as regards the limited quantity of fibre adhering to the seed, noted by Mr. Willis, I believe the Sea Island description of seed is never entirely covered with fibre, and I find this specimen *more* covered than any which has come under my observation, raised from that kind of seed in India.

It would be a mine of wealth to this country, if such cotton could be produced in quantity: its great market value would admit of a large outlay in its production.

WM. HAWORTH."

3*rd November*, 1854.

Communications on various subjects.

The following communications were then read:—

1. From the Secretary of the Society, dated Perth, 25th August last, and addressed to the Committee appointed by the Society for drawing up instructions to Mr. Blechynden respecting his travelling on the Society's account. Mr. Blechynden writes that he would be unable to carry out the wishes of the Committee to the extent laid down, he having taken his passage to return to Calcutta by a vessel advertized to leave on the 15th October; but intimating his desire to meet the wishes of the Society so far as his present imperfect state of health and the brief remaining period of his stay would admit. He also stated it was probable the charge for his travelling and other incidental expences at home would not exceed £25.

With reference to the above letter, the Acting Secretary mentioned that the Council had advised that the balance of the £100, remitted to Messrs. Grindlay and Co. for Mr. Blechynden's travelling expences, after payment of the expences actually incurred by him, should be made over to Mr. James

Carter in part payment of the Society's annual supply of flower seeds. This was agreed to by the Meeting.

2. From Mr. James Carter, London, with invoice of 2 cases choice bulbs and plants, ordered for the Society by Mr. Blechynden, value £16-13-6. The Acting Secretary mentioned that these had arrived in good order; the plants sent to the Society's Garden, and the bulbs advertised for distribution.

3. From R. Fortune, Esq., dated Shanghai, 30th September, 1854, advising despatch of Pœony plants.

4. From G. G. Mercer, Esq., Futtyghur, objecting to the amount of premia for Agricultural Essays being taken from the vested funds of the Society, and proposing it should be deducted from the expenditure on Horticulture.

The Meeting were of opinion that Mr. Mercer's proposal came too late for further notice, the matter alluded to having already been disposed of.

For all the above communications and presentations, the best thanks of the Society were accorded.

(Saturday, the 9th of December, 1854.*)*

Lieutenant-Colonel W. Sage, Senior Member present, in the chair.

The proceedings of the last General Meeting were read and confirmed.

The following gentlemen, who were proposed at the last general meeting, were duly elected Members:—

C. N. W. Begbie, Esq.; Edward Harcourt Longden, Esq.; H. H. Poe, Esq.; and the Hon'ble Major-General James Low, C. B.

The names of the following gentlemen were submitted as desirous of joining the Society:—

Lieutenant Hichens, Bengal Engineers,—proposed by Major Western, seconded by Major W. Abercrombie.

Rev. W. H. Boyle, Chaplain, Sealkote,—proposed by Major G. E. Hollings, seconded by Lieutenant-Colonel W. Sage.

C. F. Hudson, Esq., Officiating Political Assistant to Commissioner of Assam, Cherra Poonjee,—proposed by S. H. Robinson, Esq., seconded by R. W. G. Frith, Esq.

George Meares, Esq., Indigo Planter, Sindoree, Jessore,—proposed by W. G. Rose, Esq., seconded by S. H. Robinson, Esq.

Presentations.

The following presentations were announced:—

1. Sample of Cotton from Shahabad. *Presented by W. H. Poe, Esq., through W. G. Rose, Esq.*

2. A plant of the Assam Room plant, from the Reverend E. Higgs, of Debroghur. *Presented by W. S. Leckie, Esq.*

3. A specimen of Wood from New Zealand. *Presented by S F. Seymour, Esq.*

4. Samples of Fibre from Cherra Poonjee. *Presented by F. Skipwith, Esq.*

5. A plant of *Cobœa scandens. Presented by B. Warwick, Esq.*

6. Report of the Bombay Chamber of Commerce for the year 1853-54, *Presented by the Chamber.*

7. Some Potatoes and Wheat from California. *Presented by Mr. Ladd.*

8. A bundle of dry stalk of the plant from which the Midnapore Fibre sent by him last month is prepared. *Presented by G. F. Cockburn, Esq.*

Reports.

The Report of the Sub-Committee appointed to consider the project of the Chief Magistrate for converting the ground enclosed by the Race Course into a public garden,—which was postponed from last Meeting, was again brought forward. Upon which it was proposed by Baboo Peary Chand Mittra, seconded by the Chairman, and resolved :—

"That while the legitimate objects of the Society are not carried out to the extent to which they ought to be for want of funds, it cannot without neglect of those objects contribute towards the formation of a public garden in the Race Course so large a sum as 2,000 Rs., the expence of which ought to be borne by the community of Calcutta, for whose recreation the garden is specially intended."

It was then resolved—"That the Acting Secretary be requested to write a reply to the Government of Bengal on the subject of the public garden, to the effect that the Society do not conceive that the opinion called for from them is one which could properly come from the Agricultural and Horticultural Society, and that it was decided at this Meeting that the funds of the Society could not legitimately be disposed of for the furtherance of the objects proposed in the Chief Magistrate's letter."

A report from the Council was next submitted founded on a further letter received from Col. Jenkins, Commissioner of Assam, on the subject of renewing the seed potatoes in the Cossyah hills. Dr. Falconer having recommended that the crop should be entirely renewed by the importation of a sufficient quantity of American seed potatoes from California, Col. Jenkins with reference thereto in his reply to the Acting Secretary, dated November 12th last, writes as follows :—

"It would be desirable, I think, for the Society to make arrangements for continual supplies, and to some extent, for all the other great potato countries will be glad to get new varieties and fresh seed as well as Cherra."

On this the Council report their opinion that a sum not exceeding 500 Rs. should be devoted to this purpose by the Society, upon which it was—

Resolved.—That the adoption of the recommendation of the Council regarding the supply of seed potatoes from California be postponed, and that

the Acting Secretary be requested to report on the qualities of the potatoes grown in India at the next Meeting, with a view to selecting, if possible, such descriptions as may be deemed the best for seed."

A report from the Council was next brought forward, founded on the minute, submitted to the last Meeting, of Mr. James Cowell, Member of the Cotton Committee, to whom was referred the sample of Cotton grown in the Society's garden from seed, the produce of Mr. Seabrook's plantation in Charleston, South Carolina. Mr. Cowell, with reference to the very superior quality of this Cotton, remarked that "if the Society could import a few maunds of this identical seed, it would be worth while to cultivate a few biggahs of it in the neighbourhood of Calcutta, to give it a fair trial." On which the Council recommended to this Meeting to sanction the expenditure of a sum not exceeding 250 Rs. for the purchase of seed for that purpose.

Upon which it was moved by Mr. S. Douglas, seconded by Baboo Peary Chand Mittra, and resolved—"That Mr. J. Lambert Nash be requested to assist the Society in procuring seeds of Cotton of the same description as he presented to the Society last December, and that a sum of money not exceeding 250 Rs. be placed at the disposal of Mr. Nash for this purpose, and that this motion be again submitted for confirmation as usual at the next monthly Meeting."

The Report of the Garden Committee, approved by the Council on the supplies of Horticultural seeds for next season, was then read and passed. They recommended that the supplies should comprise the usual supply of Cape vegetable seeds from Messrs. Villett and Sons—the usual supply of English flower seeds from Mr. Carter, one half the usual supply of American seeds from Mr. D. Landreth, and one-half the indent of Edinburgh seeds from Messrs. Lawson and Sons, suggested by Mr. Blechynden.

The Report of the Prize Essays Committee, as approved by the Council, was also read and adopted by this Meeting. The Report is as follows :—

"Report of the Committee of the Agricultural and Horticultural Society appointed for selecting the subjects, and deciding on the amount of reward to be offered for Agricultural Essays.

1. The Committee reported to the Council Meeting on 8th November last, recommending that a premium of 1,000 Rs. should be offered for the best Essay on the Fibres of India : upon which the Council, with reference to information afforded them by Dr. Falconer, that a work on the same subject was passing through the Press at home, referred the matter back to the Committee for further consideration.

2. The Committee now beg to recommend that the premium for an Essay on Fibres should be withdrawn for the present, and that two premia, of 500

Rs. each should be offered for Essays on the next two subjects selected by them at their last Meeting, viz. : No. 2. On the relative cost and production of the various Oil Seeds of India suitable for export No. 3. On Date tree cultivation in Bengal.

3. The Committee also beg to submit a list of rules of competition for the Prize Essays to be adopted by the Society when advertising the premia to be offered.

(Signed) Peary Chand Mittra,
" A. Grote,
" Ramgopaul Ghose,
" Wm. Haworth."

Rules of competition for Prize Essays.

1. The Essays must be of a practical character, containing the results of the writer's own observations or experiments, and not merely a compilation from books.

2. Drawings constructed to a stated scale shall accompany writings requiring them.

3. All competitors to enclose their names in a sealed cover, superscribed only with their motto and the subject of the Essay.

4. The President or Chairman of the Council shall open the cover on which the motto designating the Essay to which the premium has been awarded is written, and shall declare the name of the author.

5. The Chairman of the Prize Essay Committee shall alone be empowered to open the motto paper of every Essay *not* obtaining a premium that he may think likely to be useful for the Society's objects, with the view of consulting the writer confidentially as to his willingness to place such Essay at the disposal of the Committee of papers for publication.

6. The copyright of all Essays for which a premium has been awarded shall become the property of the Society for publication in their journal or otherwise, unless the author shall publish it on his own account within six months from the date of the premium being awarded.

7. The Society are not bound to award a Prize, unless they consider one of the Essays deserving of it, but may award such part of the premium as the Essay may be adjudged to deserve.

8. In all reports of experiments the expences shall be as accurately detailed as practicable.

9. The Calcutta bazar maund of 80 sicca weight to the seer, and the Company's Rupee, are the only weight and currency in which calculations are to be made.

10. No prize shall be given for any Essay that has already appeared in print.

11. All Essays to be addressed to the Secretary of the Society, Metcalfe Hall.

The Report of the Cotton Committee, on samples of Cotton grown by Mr. J. H. Prinsep at Buttala, was next submitted as follows :—

"In reply to your note of May, 1854, sending me Cotton musters, as well original letter from J. H. Prinsep, Esq., relating to this Cotton, I have to observe.

From its appearance the fibre is fine and very silky; its staple is of fair average for this presidency; it is pretty strong, and adheres slightly to the seed.

These small parcels to test by, generally grown upon well selected soil, and well watched in culture, can but give a very imperfect idea of bulk or secure a knowledge of a true value in the English market; but I regard the quality adapted for spinning purposes there.

EDWARD SMITH."

"I concur with Mr. Willis in his minute as to the merits of this sample of Cotton, the fibre being remarkably soft, silky, long and flexible for a cotton of three years acclimation in this country. It is also of fair strength, and the seed well covered with wood, which is easily detached, whilst it does not possess in the smallest degree the coarse, rough and wiry nature of country grown cotton generally. It would be satisfactory to know the original stock of this cotton, and Mr. Prinsep would oblige the Committee by discovering this, if possible. Although, from a close examination of the seed, it bears some of the properties of the Upland or New Orleans varieties, yet it differs in other material respects, the fibre being more long silky, soft and pliant. It appears to me to be one of the green seed or short stapled cottons, but changed and improved by soil or climate, or perhaps both together.

CALCUTTA, 22*nd Nov.*, 1854. JAMES COWELL."

"Now this cotton in seed would appear to be of the green furred seed, and thus akin to the Upland Georgia or New Orleans Cottons.

It may have been of what is termed Petty Gulph kind.

If it should have originated from the black seed or Sea Island stock, then it has, as would be likely, changed its nature from its growth in the interior, and acquired, especially as its seed exhibits, the character of the N. American Uplands Cotton.

The seed is of good bold size and remarkably well covered with cotton fibre.

The fibre is very fine, good length and good strength, silky and flexible; and it is in all respects well suited for the Europe machine spinner.

I am pleasingly surprised to find that after three years of acclimation in the Punjab, I have *not* to record that this cotton has acquired the harshness,

ness and shortness of fibre generally found in the Cotton indigenous to a large portion of the Cotton districts of Upper India.

And be it not forgotten that this specimen has had the advantage of a changed site of growth, from Scalkote to Battala.

J. Willis."

The Gardener's Monthly Report for November was then submitted. Mr. McMurray writes as follows :—

"In continuation of my report for the month of December last on Mr. J. Carter's English flower seeds of this season's importation, I have now to add that six out of the ten kinds of seeds then reported not up have since germinated, which leaves at present only four sorts out of the eighty-six kinds not germinated. A list of the whole seeds received is now forwarded for laying before the Members wherein the date of sowing, germinating, kinds of seed which are bad, &c., will be seen.

The row of Cocoanut trees grown along the north belt of the garden have set a large number of fruit this season, and the young plantation of Singapore Betel and Cocoanut trees grown along the west boundary have made a healthy growth. The 234 Singapore Betelnut seed presented to the Society in September last by J. Agabeg, Esq., have germinated.

The American Apple and Pear trees are doing well, and have flowered again this season, but set no fruit.

The several kinds of Peach trees under cultivation in the plot of ground which was thoroughly under surface drained in 1852 have done exceedingly well during the rains, and are now densely set with fruit bearing buds for next year's crop.

The Cabul and China Walnut, English Oak, Cape Holly, and Irish Filbert trees are all in good health,.

The Rev. E. Higg's presentation of one room dye plant from Upper Assam was received in good order on the 17th November. This plant is a '*Justicia* species,' or belongs to that natural order, and is very much like the Chinese blue dye plant or '*Justicia* species' received from Mr. Fortune in March last. There is every probability that the Chinese are indebted to Assam for their blue dye plant as I observed in a late number of the *Gardener's Chronicle*, now in your office, an article written by Mr. Fortune wherein he stated to the effect that the Chinese plant was tender, and that it grows most luxuriantly during the summer, and is no doubt very productive, having evidently been introduced from a more southern latitude. Now should this be the plant, as I have every reason to believe it is, here we have the far-famed blue dye plant of China growing side by side with the Chinese grass cloth plant in the jungles of Assam. The article I have referred to in the *Gardener's Chronicle* by Mr. Fortune is well worth publishing in the Society's journal, or even with the monthly report in the Calcutta papers.

The four kinds of bulbous plants received from Mr. J. Carter on the 11th November were in good health, but the box containing ten kinds of plants in pots were found all dead but one, and that nearly so, the name of which is '*Rondeletia speciosa major.*' The whole of these plants seemed too young to live during a six weeks' passage without water.

Mr. G. Bartlett's presentation of five nectarine and one rose plants were received on 14th November in very good health.

Mr. G. Maelcod's contribution of one Gesneria and one Clematis plant were received on the 14th November in a healthy state.

Mr. J. Carter's Victoria pea, received on 17th November, has only yielded seven per cent sown in a gumlah, and has come up very badly in the ground.

Mr. C. B. Stewart's presentation of ten Araucaria plants, twenty-one kinds of Texian and sixteen sorts of English flower seeds, were received on the 20th November in very good order.

Mr. W. Stalkartt's contribution of one new species of Combretum, was received on the 29th November in a healthy state."

The Flax Committee's Report on samples of Bast received from Major Phayre, Rangoon, was then submitted. (See page 142.)

Communications on various subjects.

The following communications were then read —

1. From C. F. Hudson, Esq., dated Cherrapoonjee, 25th November, referring to correspondence with Col. Jenkins respecting the renewal of Potato crop, and requesting 10 mds. of California potatoes to be sent to him.

2. From Messrs. Grindlay and Co., dated London 19th October, acknowledging receipt of 60£ Bill for Mr. Blechynden's travelling expenses.

3. From Messrs. Grindlay and Co., dated London, 19th October, with Bills of Lading per *Alfred* on 5 packages wire fence for the Society.

4. From Mr. James Carter, dated London, 24th October, with Invoice of 300 rose slips, value £3-17-6.

5. From A. H. Blechynden, Esq., dated London, 25th October, acknowledging receipt of letter of 4th September, and advising despatch of Hop and American Flax seed, also mentioning parties who would experiment on Indian Flax and Rheea Fibres, and report results to the Society.

6. From G. F. Cockburn, Esq., sending a bundle of dry stalk of the plant from which the Midnapore fibre sent by him last month is prepared.

7. From Dr. H. Falconer, reporting on a sample of Gutta Percha, forwarded by Mr. C. N. W. Begbie, of Maulmain.

For all the above presentations and communications the thanks of the Society were accorded.

Report of the Agricultural and Horticultural Society of India, January, 1855.

The Council, in submitting their Report of the operations of the Society for the past year, commence as usual with a summary of the state of the subscription list. This they have much pleasure to record is satisfactory, shewing a total on 31st December of 645 members, of whom 521 are resident or paying, 38 Life Members, 71 absent, and 15 Honorary, Corresponding, and Associate Members. The list as made up to 31st December, 1853, shewed a total of 618 members, of whom 508 were on the resident or paying list, 39 Life Members, 54 absent, and 17 Honorary, Corresponding, and Associate Members. The increase therefore, as compared with the list on 31st December, 1853, is a total of 27 members, and an increase of 13 in the number of resident or paying members: but for the number of members absent from India at this date being unusually large, viz. 71, or 17 more than were absent at the corresponding date of the last 2 years, the comparative state of the resident paying list would have been still more satisfactory. The total number of new members enrolled during the year is 72, whilst on the other hand the number of resignations has been 32, of deaths 9, and of names struck off as defaulters for non-payment of arrears 4, total 45, leaving the nett increase as above stated.

The following is the classification list of members at present:—

Classification.	In 25 former years.	In 1846.	In 1847.	In 1848.	In 1849.	In 1850.	In 1851.	In 1852.	In 1853.	In 1854.	Gross Total.	Total real number at close of 1853 after deducting lapses.
Honorary Members, ...	11	1	0	1	0	0	0	1	0	1	15	9
Asscciate Members, ...	2	0	0	0	0	1	1	0	0	0	4	2
Corresponding Members, ..	0	1	0	0	0	0	1	1	1	0	4	4
Civilians, ...	232	13	15	22	8	10	22	16	18	6	362	149
Merchants and Traders, ..	201	14	12	13	10	14	20	12	5	16	317	110
Indigo and other Tropical Agriculturists, ...	190	15	6	5	1	9	19	13	10	7	275	91
Military Officers, ...	160	10	11	11	11	9	34	18	22	19	305	146
Medical Officers, ...	80	0	2	3	5	7	4	5	3	4	113	34
Asiatics, ...	63	2	14	5	6	9	8	8	8	5	128	49
Clergy, ...	14	1	0	0	0	2	1	1	1	1	21	6
Law Officers, ...	40	1	0	0	6	4	6	3	1	3	64	23
Miscellaneous, ...	9	0	2	0	2	2	6	0	0	10	31	22
	1002	58	62	60	49	67	122	78	69	72	1639	645

Amongst the members lost to the Society by death during the past twelve months, the Council regret having to record the name of Dr. N. Wallich, formerly Superintendent of the Botanical Garden, and since his retirement from India in April, 1846, one of the Society's most valued corresponding members. The Society have already recorded their deep sense of their loss by a vote of respect to his memory passed at their July meeting.

Another old member and invaluable promoter of the objects of the Society, Mr. Willis Earle, has been removed by death from amongst us, and a like tribute of respect to his name has been voted.

The other members deceased during the year are Mr. G. T. F. Speede, a zealous Horticulturist, and author of several works on the subject of Indian Gardening; Mr. W. Storm, formerly a Vice-President of the Society; Baboo Motelall Seal; Brigr. T. Palmer; Mr. J. Cearns; Major W. H. Nicholetts, and Mr. Stephen Mornay, an intelligent and industrious Agriculturist in Assam.

Respecting the important matter of finance, the Council are again able to report favorably of the position of the Society. The annual statements of the receipts and disbursemeuts, vested fund, arrears of subscription and liabilities, are submited herewith. The total receipts during the year amount to Rs. 28,562-15-1, adding to which the balance in hand at the close of 1853, viz. Co.'s Rs. 2,347-5-2, shews the total of receipts as per statement Co.'s Rs. 30,910-4-3. The disbursements, during the year amount to a total of Rs. 29,902-13-4, which deducted from the receipts, leaves the balance of cash in the Bank of Bengal, with the Government Agent, and with the Secretary on 1st instant, Rs. 1,007-6-11.

The amount of members' subscriptions realized during the year it will be seen is Rs. 15,450-14-6, being considerably less than last year, during which the amount collected was Rs. 17,913-8-0,* but about the same as during 1852, when the amount was Co.'s Rs. 15,534-9-9. The total of miscellaneous receipts for seeds sold, grafts, &c., delivered from Nursery Garden, and proceeds of Journal sold, &c., &c., amounts to Rs. 2,603-1-6, being about

* This however, includes Rs. 1,200 from 3 members, who consolidated their subscriptions in that year.

267 Rs. less than in 1853, a considerable amount remaining due to the Society under this head, being Rs. 1,051-4-0 for seeds sold alone, the delay in realizing which during the past year is accounted for by the unusually late arrival of the Cape and English seeds.

The vested fund, it will be observed, now stands at Rs. 20,333-5-4 in Company's Paper, or 2,000 Rs. less than at the end of 1853, that amount having been sold out in January last year, to meet an advance of salary to the Society's Secretary, Mr. Blechynden, on the occasion of his going to England on leave for twelve months for the recovery of his health.

On a comparison of the disbursements with those of last year, it appears that in 1853 the total thereof amounted to Rs. 29,130-7-8, and deducting therefrom the extraordinary item of Rs. 5,070-2-6, the Government prize for a Cotton-cleaning machine, left the nett ordinary disbursements of the Society for that year at Rs. 24,060-5-2. In 1854, the total disbursements amounted to Rs. 29,902-13-4, and deducting therefrom the Rs. 1,000 charged to the account as part repayment of a loan from the Bank of Bengal, leaves the nett expenditure at Rs. 28,902-13-4, or Rs. 4,842-8-2, more than in 1853: this arises principally from the additional expenditure under the head of Establishment, to cover the allowance to an Acting-Secretary during Mr. Blechynden's absence; the expence of one Part of the *Journal* more than last year, and the more liberal allowance in prizes for Horticultural Shows, to be referred to hereafter.

The total liabilities of the Society, for seeds, &c., received in 1854, and balance of a loan from the Bank of Bengal, amount to Rs. 8,892; but this it will be seen is more than counterbalanced by the amount due for arrears of subscription, and for seeds, grafts, &c., supplied, amounting in all as per statement, to Rs. 9,356-12-0,

The Society has continued its active measures, for the encouragement of Horticulture, by holding public shows of vegetables, fruits, and flowers. Of these four were held from January to April, and one in December last, and the Judges in their reports thereon announce a steady progressive improvement in the vegetable department; but the exhibitions of flowers were not on the whole judged to be

equal to those of some former years; this was in some measure attributed to the failure of the English flower seeds supplied to the Society by Mr. J. Carter in 1853, which tended especially to curtail the produce of annuals in the vicinity of Calcutta. The cultivation of Orchids however seemed, from the numbers and new varieties of those beautiful plants brought forward, to be greatly and successfully on the increase. In the five exhibitions, the Society awarded a total of Rs. 1,431 in prizes, viz.: Rs. 1,036 for fruits and vegetables, and Rs. 395 for flowers, being above 50 per cent. more than was distributed in 1853; the total sum awarded in that year being 919 Rupees.

Whilst the Society has so liberally encouraged Horticultural pursuits however, their attention has also been directed in several ways to the improvement of the Agricultural resources of the country. Besides the importation of cotton and tobacco seeds from America, and their distribution to various quarters of India, especially to Assam, the Society has endeavored to incite an interest in the improvement of the various valuable fibre-yielding plants of the country, by publishing in their proceedings a number of reports by their Hemp and Flax Committee on fibres submitted to them,* and by offering a premium of Rs. 1,000 for the most successful cultivation of the Rheea plant and manufacture of its fibre. It has also recently advertised its offer of two premia of Rs. 500 each for the best essays on select Agricultural subjects, to be submitted to it in 1855, intending to continue the same offer annually. There would seem to be a growing conviction amongst its members, that the Society by these and kindred measures may effect a great deal more than it has hitherto done for the improvement of Indian Agriculture.

In furtherance of the same objects, the Society also designed to avail of their Secretary Mr. Blechynden's leave of absence to England, by instructing him to visit the principal places of Great Britain, France, and Belgium, where he could witness, and collect information on the most recent agricultural processes in use, more especially

* The Society has also caused the more valuable of the papers on fibres submitted to them to be translated and published in the *Indian Agricultural Miscellany*.

on the cultivation and manipulation of flax and other economic fibres, and the sum of £100 for his travelling expences, and an extension of leave for 3 months beyond the year's absence originally allowed him, were voted by the Society: but the Council regret to report that Mr. Blechynden's continued ill health, and other causes, have only admitted of his meeting the Society's views very partially.

The Society has during the past year imported for the use of its members the usual full supplies of American vegetable seeds from Mr. D. Landreth; Cape vegetable seeds from Messrs. Villet and Son, and English flower seeds from Mr. J. Carter. The two latter supplies appear to have given entire satisfaction to the members, but the supply from America has resulted very indifferently, and several of the more important kinds have entirely failed. The disappointment occasioned by this failure to many of the distant members has been great, and the Society decided to mark their sense of it by ordering for next season's supply only one half the quantity usually invoiced by Mr. Landreth; and to supply the deficiency, have directed another trial shipment of about half the usual quantity furnished to members to be sent by Messrs. Lawson and Son, the well known seedsmen of Edinburgh, who have promised to use their best exertions to provide an early and superior selection. The Society has also through the agency and zealous co-operation of Mr. R. Fortune, in China, procured during the year a number, in all twelve packages, of valuable contributions from that country, both seeds and plants, including the Chinese green dye plants (a good crop of which is now growing in the Society's Garden), the *Chamærops* or Hemp Palm, the *Salisburia*, the soap bean tree, the Funereal Cypress, the wax insect tree, and many other valuable, and some quite new, species of useful and ornamental vegetation. Most of these have succeeded in the Society's Garden, and will it is hoped, in due time, form a nucleus for diffusing many valuable plants throughout the country. The sum of Rs. 500 placed at Mr. Fortune's disposal by the Society, in December, 1853, has thus proved a most valuable investment. Liberal presentations have also been received from several members, including peach grafts from F. A. Glover, Esq., Moteharree; tobacco and rice seeds from

Arracan from Lieut. Ripley, and through the late Mr. Willis Earle; and various contributions from Sir L. Peel, Messrs. C. J. Simons, J. Agabeg, B. Warwick and others.

Enriched by the above contributions, as also by the importation of a large supply of peach and nectarine grafts from Dr. Jameson at Sahurunpore, the Society's Garden, under the able superintendence of Mr. McMurray, and with the addition of a new conservatory, and other improvements, has greatly advanced in variety of productions and general usefulness; this is evinced by the comparative amount realized by sale at reduced prices of fruit grafts, &c., during the year, being Co.'s Rs. 672-10-0, against Co.'s Rs. 351-5-9 in 1853.

Before leaving the subject of the Nursery Garden, the Council must not omit to record the measures the Society has taken for improving the Garden School. This had hitherto been available only for the most rudimentary kind of native education to the ten or twelve boys employed in the Garden. The Society, by enlarging the accommodation, appointing an additional school-master, and placing the supervision of the school under the Rev. Mr. Long, who has kindly promised to take an interest in its progress, expects to educate at least double the above number of boys, and in such a manner as to make them available as intelligent and efficient malees, a class of persons of which great want is felt at present: the whole expence of this improvement is estimated at Rs. 32 per month.

Two Parts of the Society's *Journal*, completing the 8th Volume, have been published during the year, and Part I of Vol. IX. is in the press. Of the *Agricultural Miscellany* two parts, viz., 3 and 4 have also been published, and the Council have much satisfaction in observing the increasing popularity of this little work, due no doubt in great measure to the good judgment and ability displayed by the Committee who manage it, in the translation and selection of matter usefully adapted to its readers. The great demand for the work has called for a reprint of 500 copies of Part I, and the Society has decided that a charge of four annas per number, being about the cost price, may be fixed upon it for the future, without fear of contracting its circulation.

Statement of Receipts and Disbursements of the Agricultural and Horticultural Society of India from 1st January to 31st December, 1854.

RECEIPTS.

From Members, Subscriptions collected during the year, ...	Co.'s Rs.			15,450	14 6
Government Annual Donation, ...	1,045	0	0		
Ditto, monthly allowance for 12 months at 135-13-6 per month, ...	1,630	2	0		
Hon'ble Sir Lawrence Peel, annual donation, ...	400	0	0		
The Most Noble the Marquis of Dalhousie, annual donation, for the year 1854, ...	500	0	0		
				3,575	2 0
Bank of Bengal, a loan on deposit of 6 Company's papers, (Rs. 4,000)				3,800	0 0
Government Agent proceeds of 4-5 per cent. Company's papers sold, ...				2,000	0 0
Accruings of interest on fixed assets, ...				735	13 1
Maha Rajah of Gwalior on account of glazed cases, ...	200	0	0		
Ditto on account of freight for glazed cases of plants, ...	198	0	0		
				398	0 0
Proceeds of Sugar-cane delivered from the Nursery Garden, including cost of packing, ...	80	3	6		
Proceeds of fruit-tree grafts delivered from the Nursery Garden, ...	562	6	6		
Ditto, of 3 mds. of tobacco leaves do.	30	0	0		
Ditto, of a proportion of surplus Cape and American vegetable and English flower seeds of 1853-54, ...	1,498	3	3		
Ditto, of German and French flower seeds, ...	102	0	0		
Ditto, of bulbs, ...	15	6	0		
Ditto, of copies of *Transactions* of the Society, ...	6	0	0		
Ditto, of copies of *Journal* of do.	84	4	0		
Ditto, of copies of *Indian Agricultural Miscellany* sold, ...	13	9	0		
Ditto, of American cotton seeds on acct. of Mr. D. Landreth,	85	8	0		
Ditto, of old seed boxes, ...	7	8	0		
Members, amount repaid for postages, pots, and packing charges for seeds, &c., ...	42	13	6		
,, Ditto, amount of freight, &c., repaid on boxes of seeds forwarded to their addresses in 1853-54, ...	75	3	9		
				2,603	1 6
Receipts, Total Co.'s Rs., ...				28,562	15 1
By Balance in the Bank of Bengal on 31st December, 1853, ...	2,196	1	4		
ditto in the hands of Government Agent, ditto, ...	118	13	1		
ditto in the hands of Secretary on ditto, ...	32	6	9		
				2,347	5 2
Grand Total Receipts Co.'s Rs.				30,910	4 3

DISBURSEMENTS.

Foreign Vegetable and Flower Seeds.					
By Messrs C. M. Villet & Son for Cape garden seeds supplied in 1854,		2,160	0	0	
,, Mr. D. Landreth, towards meeting cost for American garden, cotton and maize seeds supplied in 1853, amounting to Sp. dolrs. 1,550-66, and bal. of his acct. for 1851-52 amounting to Sp. dolrs. 476-21, ...		4,052	2	9	
,, Mr. James Carter, in full of his bill, amounting to £ 251-18 for English flower seeds, supplied in 1853, ...		1,526	15	4	
					7,739 2 1
Library.					
,, Books purchased during the year for the Library, ...		367	12	11	
,, Binding books during the year, ...		15	5	0	
					383 1 11
Printing.					
,, Sundry parties for printing receipts and schedules of prizes for flower shows, &c., &c., ...					131 11 0
Medals.					
,, Grindlay and Co. to meet the cost on acct. new dies for gold and bronze medals, ...					742 4 3
Journal.					
,, Bishop's College Press, for printing Parts 4 and 5 of Volume VIII,		957	8	0	
,, Mr. G. H. Stapleton for drawing and lithographing 650 copies of diagrams for the Journal Part 1 of Volume IX., ...		50	0	0	
					1,007 8 0
Nursery Garden.					
,, Ordinary expences incurred on account of the Nursery Garden ,, from 1st December, 1853, to 30th November, 1854, ...		3,334	3	3	
,, Extra ditto, for building a new conservatory, purchase of fruit seedlings for grafting, for pots, &c., ...		634	4	0	
,, Dr. W. Jameson, to meet expenses for forwarding peach grafts,		150	0	0	
,, Grindlay and Co., ditto for wire fence, bell-glasses, &c., ...		303	2	6	
,, Supt. H. C. Botanic Garden, on acct. of Maha-Rajah of Gwalior, for 12 glazed cases, ...		192	0	0	
					4,613 9 9
Interest.					
,, Secy. Bank of Bengal, on a Loan of Co.'s Rs. 3,800, ...					82 2 0
Bank of Bengal Loan.					
,, Secretary Bank of Bengal, in part payment of Loan, (Rs. 3,800,)					1,000 0 0
Establishment.					
,, Amount for Establishment from 1st December, 1853, to 30th November, 1854, including a payment of 2,000 Rs. on account to Mr. A. H. Blechynden, on his leaving for England,		8,807	3	6	
,, Mr. A. H. Blechynden, on account of his travelling expenses, *		1,058	11	3	
					9,865 14 9
Pecuniary Rewards.					
,, Prizes to Mallees for vegetables and fruits at the Exhibitions held on the 20th January, 25th February, 14th March, and 23rd December, 1854, ...		1,036	0	0	
Carried over, Co.'s Rs., ...		1,036	0	0	25,565 5 9

* Only a small portion of this sum has been drawn.

Brought forward, ...	1,036	0	0	25,565	5 9
By Prizes to Mallees for flowers at the Exhibitions held on the 20th January, 25th February, 14th March, 7th April, and 23rd December, 1854, ...	395	0	0		
				1,431	0 0
ADVERTISEMENT.					
,, Advertising in the Calcutta and Up-Country Newspapers notices of General Meetings, of Shows of Vegetables and Flowers, Distribution of Seeds, &c., &c , ...				506	7 3
INDIAN AGRICULTURAL MISCELLANY.					
,, P. S. DeRozario and Co. for printing Parts 3 and 4, Vol. I. of the *Indian Agricultural Miscellany*, ...	143	4	0		
,, Mooktaram Summono for translating and revising most of the papers, &c., for ditto, ...	80	0	0		
				223	4 0
STATIONERY.					
,, Stationery for Office books, &c., and for the use of the office, ..	30	4	0		
,, Brown packing paper for packing seeds, ...	98	3	0		
				128	7 0
FREIGHT.					
,, Freight on boxes of seeds, books, &c., sent and received from the Cape of Good Hope, America, &c., ...				594	1 6
METCALFE HALL.					
,, Society's proportion of Assessment on Metcalfe Hall from Nov., 1853, to October, 1854, ...				131	4 0
MACHINERY ACCOUNT.					
,, Messrs. Bates, Hyde and Co. in full of Government prize,	18	0	0		
,, Ditto for a Saw Gin, purchased at cost price Sp. Dolrs., 75, =	150	0	0		
				168	0 0
POSTAGES AND SUNDRY OTHER CHARGES.					
,, Postage on letters, &c., sent and received, and on copies of the Journal, and for petty expences, ...	843	1	0		
,, Extra packermen for subdividing seeds, ...	18	12	0		
,, For expences incurred in putting up a fence round a portion of the Auckland Circus, for superintending the erection of tents for flower and vegetable shows, ...	207	13	6		
,, Presents to Constables for attending at Horticultural and Floricultural Exhibitions during the year, ...	60	0	0		
,, Government Agents Commission, brokerage, &c., charges during the year, ...	25	5	4		
				1,154	15 10
Total Disbursements, Co.'s Rs.,				29,902	13 4
,, Balance in the Bank of Bengal on 31st December, 1854, ..	698	6	8		
,, Ditto in the hands of Government Agent on ditto, ...	269	10	6		
,, Ditto in the hands of Acting Secretary on ditto, ...	39	5	9		
				1,007	6 11
Grand Total, Co.'s Rs.,				30,910	4 3

MEMORANDUM.

Disbursements.

To Amount of Disbursements during the year 1854, as per Statement, ...			29,902	13 4
,, Balance in the Bank of Bengal on 31st December, 1854, ...	698	6 8		
,, Ditto in the hands of Government Agent on ditto, ...	269	10 6		
,, Ditto in the hands of Actg. Secretary on ditto,	39	5 9		
			1,007	6 11
Total, Co.'s Rupees,			30,910	4 3

Liabilities.

Amount due by the Society for American vegetable, &c., seeds in 1854, ... Sp. Dolrs., 1,651-68 0=	3,302	0	0
Ditto for English flower seeds, bulbs and rose slips, amounting to, ... £279 1 0=	2,790	0	0
Balance due to the Bank of Bengal on deposit of Company's Papers, ...	2,800	0	0
Co.'s Rupees,	8,892	0	0

Receipts.

By Amount of Receipts during the year 1854, as per Statement, ...			28,562	15 1
,, Balance in the Bank of Bengal on 31st December, 1853, ...	2,196	1 4		
,, Ditto in the hands of Government Agent on ditto, ...	118	13 1		
,, Ditto in the hands of Secretary on ditto, ...	32	6 9		
			2,347	5 2
Total, Co.'s Rupees,			30,910	4 3

Dependencies.

Amount invested in Government Securities lodged in the Government Agency Office, ...	16,333	5 4		
Ditto lodged in the Bank of Bengal as Security for Loan, ...	4,000	0 0		
			20,333	5 4
Amount of Subscriptions in arrear, ...	7,582	11 9		
Amount of outstandings for seeds, grafts, copies of Journal, &c., ...	1,774	0 3		
			9,356	12 0

E. E.
S. H. Robinson,
Acting Secretary.

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